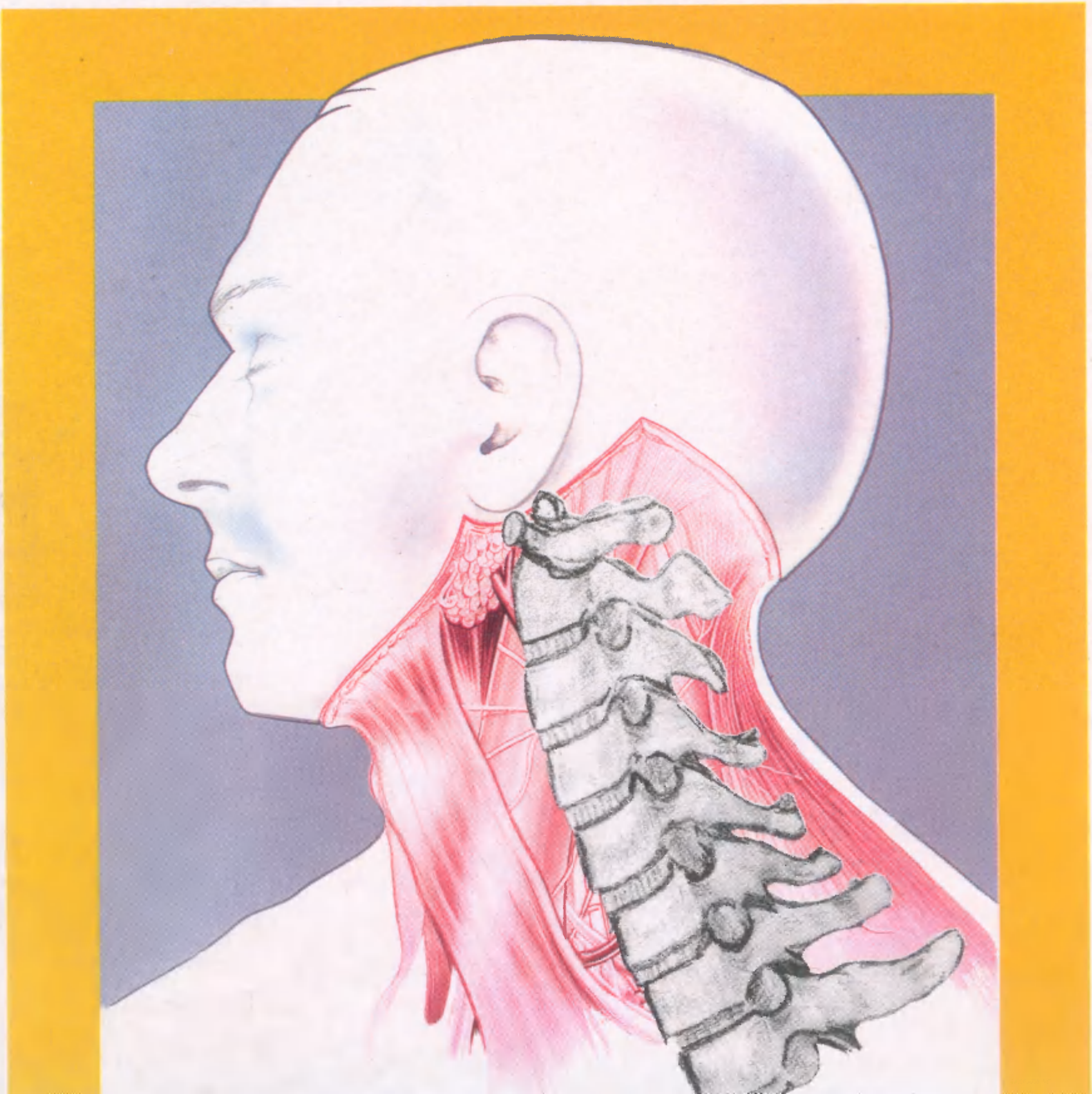
NECK PAIN
&
RELATED PROBLEMS

DR. V. T. INGALHALIKAR



NECK PAIN
AND
RELATED PROBLEMS

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My teachers taught me to believe that medical knowledge is a property of the whole mankind.

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However, acknowledgement of this booklet as a source will be appreciated.

DR. V. T. INGALHALIKAR

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Introduction

Neck pain is one of the common complaints for which patients approach family physicians. The routine medical curriculum does not include rational, systematic deliberations on diagnosis and management of these cases. The family physician, over the years learns to treat these patients empirically and as per the prevalent trends. His learning process is often based on his occasional communications with the consultants whom these patients may have visited, or on their prescriptions.

There are many misconceptions about the nature of problems, about their natural history and also about their management.

Improvement in the clinical competence is a demanding task. It involves understanding the problems rather than learning only treatment plans. This is worthwhile, since the treatment plans, then, evolve almost naturally and one really learns when not to handle a particular case.

There are many varieties of the management regimes. Some are irrational, illogical and based on whims of the treating clinician rather than on scientific facts, but still very much popular. Certain treatment modalities are wrongly credited with high utility. Some are wrongly disreputed as useless, while others, like surgery, are utterly condemned.

Many recent advances in the basic knowledge and alternate ways of thinking about old problems have made our previous decade's education seem outdated.

We clinicians are continuously being bombarded by bits and pieces of information about medical advancements and commercial literature about treatment modalities available. One must develop an ability to recognize plain propaganda and advertisement with the help of the current knowledge. Generally it is true that newer treatment modalities come into existence to do away with the short-comings of the existing ones. But there could be exceptions.

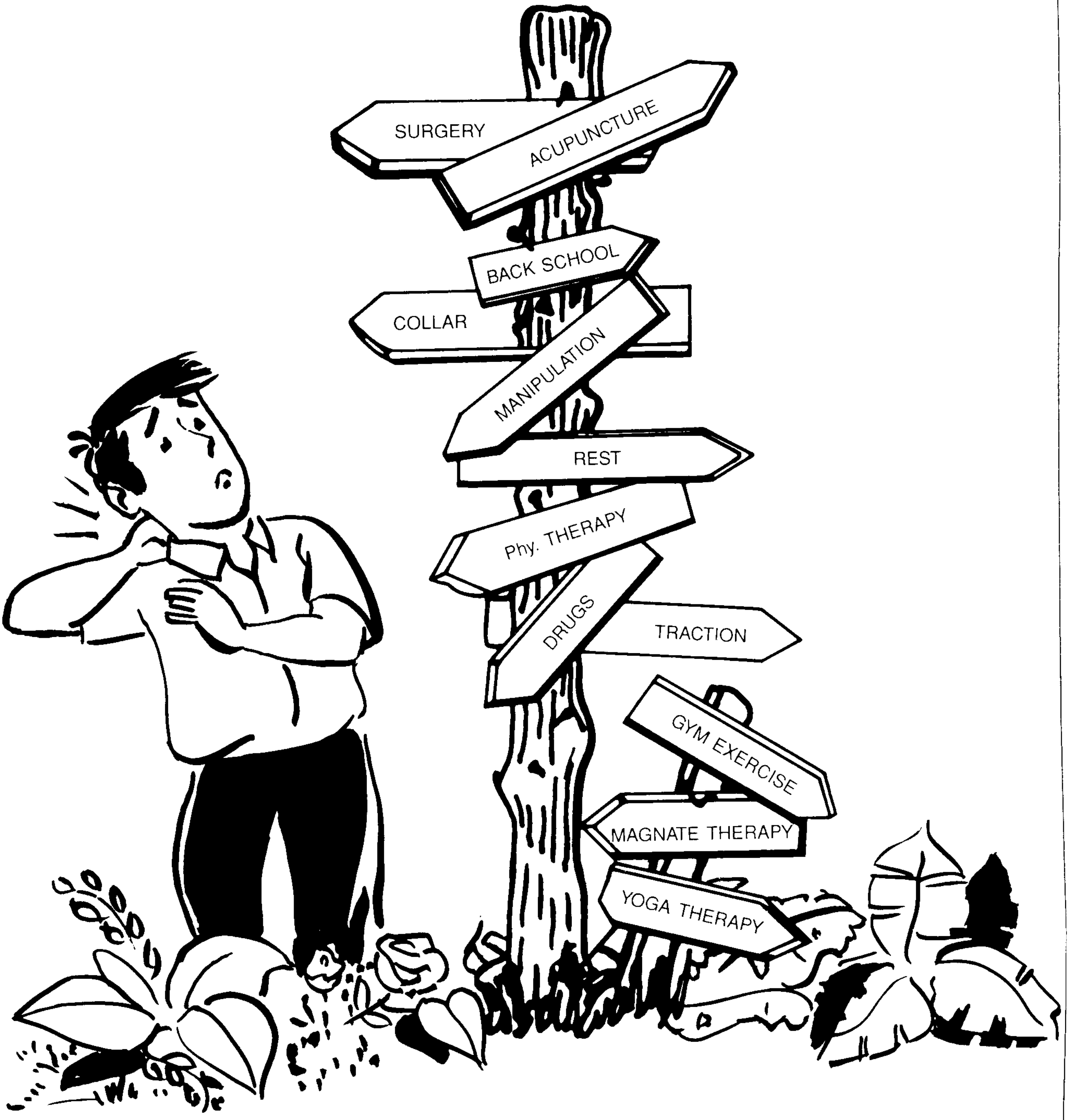
On the other hand, one must also realise that in spite of the tremendous evolution of the medical science, not every thing that is proved to be effective **'on the clinical shop floor'** in getting our patients better, could be scientifically sorted out. Though medical science knows so much, it still knows perhaps very little.

In this small booklet we have tried to bring out in brief, the clinically relevant facts in such a manner, that any clinician without a background of specialized training could be benefited. There are many symptoms other than pain, like paresthesia, giddiness, headaches etc., which are commonly associated with cervical problems. There are many allied clinical conditions, which, though not of cervical origin, still confuse us in diagnosis and management. They are relevantly dealt with here. The information is grouped in clinically useful manner and flow charts are given to help the doctor in management. Affections like infections, trauma and tumours are not dealt with in detail due to constraints of space.

This, by no means, is a complete encyclopaedia of cervical pain medicine. The interested readers may need to refer to detailed books on the subject.

It is hoped that, at the end of the reading this booklet, the clinicians do find many hazy patches of existing information clarified. It is also hoped that their patients' management becomes more rational and more patients find themselves relieved of their neck problems. That would be our reward for taking these efforts.

Though many persons have contributed towards preparation of this booklet, Dr. Mrs. S. V. Ingalhalikar, Dr. Miss E. Coutinho and Miss Anagha Ingalhalikar deserve a special mention for their share.


SURGERY
ACUPUNCTURE
BACK SCHOOL
COLLAR
MANIPULATION
REST
Phy. THERAPY
DRUGS
TRACTION
GYM EXERCISE
MAGNATE THERAPY
YOGA THERAPY

Understanding the Cervical Region

In the course of evolution the quadruped animals changed into biped human beings. The quadruped animal's trunk was suspended by two forelegs and two hind legs. The structure of an individual vertebra and the assembled construct i.e. the vertebral column had to undergo lot of adaptations to suit its new vertical biped stance and the load bearing.

Our spine is a tall column of 33 vertebrae and is a wonderful compromise between two opposing necessities. One is STABILITY and the other is FLEXIBILITY.

Our spine is a wonderful compromise between two opposing necessities — one is STABILITY and the other is FLEXIBILITY

STABILITY : This tall column of bone must be cohesive enough to maintain its necessary shape while bearing all the load-bearing brunts. It must also withstand both vertical and horizontal stresses while functioning. If these bones were articulated as loosely as our other joints like shoulder or hip for the purpose of giving excellent mobility, even the normal functions like getting up to a sitting posture would not have been possible. This chain of vertebrae houses the delicate neural structures in it and only as much mobility should be allowed as would be harmless to these structures. This is achieved by breaking down the total mobility range over many segments, each one having limited motion. The requirement of stability could be met by making the spine a single piece of bone. But that, too, would either make most of our familiar movements impossible or would grossly curtail them as in certain stiffening conditions like Ankylosing spondylosis.

FLEXIBILITY : This is the second necessity. The spinal column must hold its shape, yet at the same time it must be capable of bending and twisting. The way in which nature has fulfilled these conflicting requirements is a masterpiece of engineering. The distribution of this mobility is done as per local requirement.

The C1C2 joint has very large rotation possible while L5S1 joint has very poor rotation. Occipital-cervical joint has excellent flexion extension possible while midthoracic region has a poor mobility in the same plane. In most areas the shape of the vertebral bodies, the shape and orientation of the facet joints and the modulating effects of the ligaments and especially the intervertebral disk are responsible for the control of these movements.

THE CERVICAL VERTEBRAE

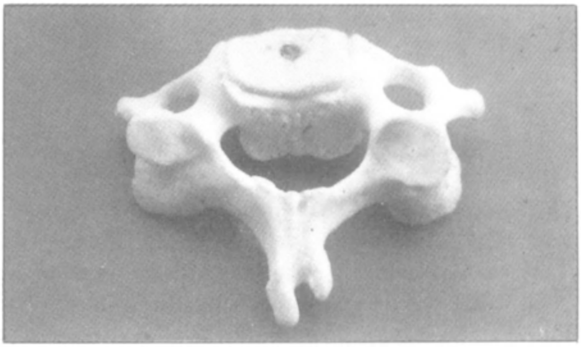


Fig. 1 Cervical Vertebra

There are seven cervical vertebrae joining the skull with the trunk. The cervical region is the most mobile of all regions. Also it houses the important cervical segments of the cord and the vertebral artery. The vertebrae, therefore, are modified to suit these purposes. Every cervical vertebra consists of small body and two lateral masses. These lateral masses have facet joint in the posterior part. The anterior portion of these lateral masses is grooved and expanded and is the transverse process. It has an aperture through which the vertebral artery passes from the root of the neck to the brain. The segmental nerves pass from the neural canal out over these processes and lie behind the vertebral artery.

The lateral part of the vertebral bodies is upturned and articulates with the similar upturned area of the next vertebra.

The main central portions of the vertebral bodies have fibro-cartilaginous joints while the lateral corners form a true diarthrodial joint with articular cartilage, capsular covering and joint cavity. These are known as Uncovertebral joints of Luschka. These joints are in close proximity of the vertebral artery and the exiting segmental nerve, and disorders of these joints can affect them.

THE INTERVERTEBRAL DISK

In between each pair of vertebrae is a remarkable structure called an Intervertebral Disk. The disk is made mainly of extremely tough concentric layers of ligament and cartilaginous material like rayon cords of a car tyre. But its central core consists of a softer and somewhat more flexible jelly-like material called the nucleus pulposus.

The Intervertebral Disk is a marvel of nature and serves several useful purposes

This intervertebral disk is a marvel of nature and serves several useful purposes. It tolerates large amounts of compressive loads and bending and twisting stresses. These disks also help to hold the spinal bones in proper alignment. They largely contribute to the spinal curvatures and have excellent shock absorption capacity.

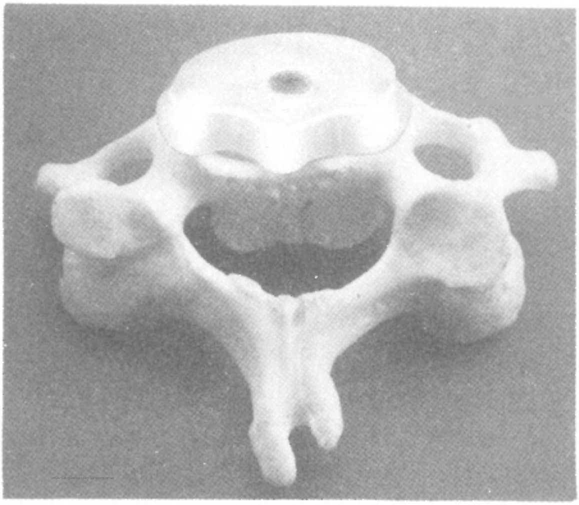


Fig. 2 Cervical Intervertebral Disk

THE CERVICAL LIGAMENTS

There are many short and long ligaments that run longitudinally connecting the vertebrae and the disks. They support and control the vertebral articulations. The anterior longitudinal ligament lies on the anterior surface of the bodies and the intervening disks, behind our pharynx. The posterior longitudinal ligament lies on the posterior surface of the vertebral bodies and the disks, within the spinal canal just anterior to the dural sac.

Another important group of segmental ligaments are formed by the capsules of the facet joints on the postero-lateral aspect.

The posterior ligaments are quite well developed. The inter laminar ligament spanning the adjacent laminae or posterior arches, is also called ligamentum flavum because of its high yellow elastic tissue content. The interspinous ligament bridges the adjacent spinous processes while the supraspinous ligament, also called Ligamentum Nuchae, is a specialised large sheet of ligament joining occipital bone with lower cervical spinous processes.

THE VERTEBRAL ARTERIES

They arise from subclavian arteries and run towards the skull through the aperture in the transverse processes of the upper six cervical vertebrae. They

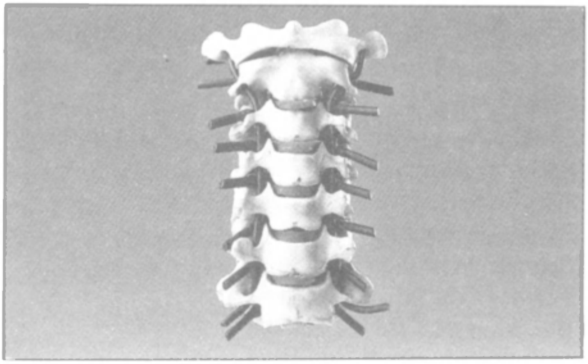


Fig. 3 Anatomy of Cervical Vertebrae

enter the skull through the foramen magnum. During their course they send segmental arteries to the vertebrae and the intraspinal branches to the roots and the cord. They end up by joining the arterial circle of Willis at the base of the brain. The branches from this area supply medullary centres and the hind brain. They can undergo compression and kinking during cervical rotations. However, in normal subjects compensatory flow from the other side is sufficient. In diseased cervical segments, the arteries could be compressed from outside, or could go into spasm or undergo atherosclerotic changes and the compensatory flow or even baseline flow could suffer. This phenomena of vascular insufficiency when symptomatic is called Vertebro-Basilar Insufficiency.

THE NEURAL CANAL

The neural canal forms a bony protection for the delicate spinal cord, its enveloping meninges and emerging nerve roots. It is large and triangular in the cervical region to accommodate the cervical cord enlargement. The transverse diameter is nearly twice the anterior-posterior diameter. The spinal cord therefore has adequate room to expand laterally but has considerably less room to expand in the sagittal plane.

The anterior boundary of the neural canal is formed by the posterior surfaces of the vertebral bodies, the intervertebral disks and the posterior longitudinal ligament. The height, thickness, position and angulation of the pedicles determine the shape and size of the canal and the space available for its contents. The posterior boundary is made up of the laminae which pass posteriorly to unite in the mid-line to form the spinous processes. The facet joints lie at the lateral angle of the spinal canal.

The ligamentum flavum connects the laminae of the adjacent vertebrae and therefore forms part of the postero-lateral boundary of the canal. The ligament plays a small role in resisting flexion of the intervertebral joint but its high elasticity aids recovery after spinal movements. In old age with the process of degeneration, the ligamentum flavum looses its elasticity and may bulge inwards into the spinal canal during extension compromising the space from behind.

THE INTERVERTEBRAL FORAMINA

The nerve roots complex occupies 35% to 50% of the cross-sectional area of the foramen. This normally allows ample room for movement of the nerve. The remaining space is occupied by loose areolar and adipose tissue containing the radicular artery with its branches, numerous veins of epidural internal vertebral venous plexus, lymphatics and the sinuvertebral nerve.

The Intervertebral Foramina becomes smaller in the lower cervical region. The degenerative, expanding and foramen narrowing pathologies are also common in these segments

The dimensions of the foramina change with spinal movements. Flexion increases the vertical diameter while extension decreases both the vertical and antero-posterior diameters.

The intervertebral foramina become smaller in the lower cervical region. The degenerative expanding and foramen narrowing pathologies are also common in these segments.

CONTENTS OF THE NEURAL CANAL

The Spinal Cord and the Meninges

The spinal cord is a continuation of the medulla oblongata and extends from the foramen magnum to

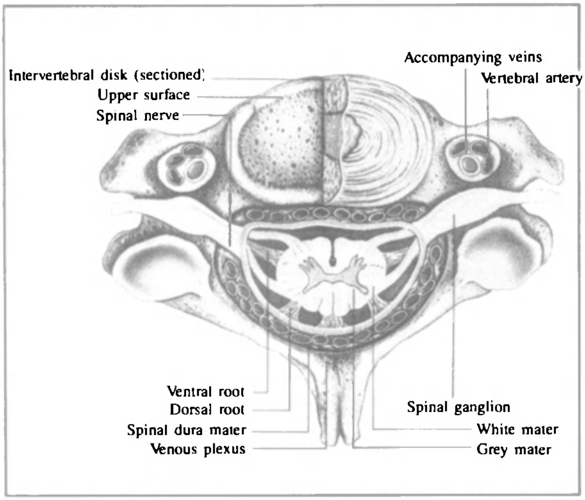


Fig. 4 Spinal Cord and Related Anatomy

the level of L2. It is expanded in the cervical region as it houses spinal segments of both the upper limbs. The spinal cord is enveloped by three membranes — the dura mater, arachnoid and the pia mater. The envelop of C.S.F. around the cord gives it excellent cushioning and shock absorption. The epidural space contains fatty areolar tissue, regional lymphatics and the internal vertebral venous plexus. These veins are large and valveless, draining the spinal cord, the bony walls of the neural canal and the cerebro-spinal fluid. They communicate with thoracic and abdominal veins and as a result, aid the equalization of the pressure in these cavities. This is what causes transmission of pressure impulse while coughing or during Valsalva's manoeuvre, to the inflammed painful cervical structures and may reproduce severe pain or root symptoms.

The Nerve Roots

In the cervical region the roots are shortest and travel slightly upwards from the dura towards the foramen. They have a very short intra-spinal course and leave the foramen almost immediately. A single level lateral pathology, therefore, usually causes affection of a single root. The lumbar roots, in contrast, have a long intraspinal course and can be affected at any of the related levels. Also a pathology at a single segment can affect more than one roots.

THE PAIN PRODUCING STRUCTURES

The following structures have pain receptors in the vertebral column:

- Anterior and Posterior longitudinal ligaments.
- Posterior Annular Fibres.
- All posterior ligaments.
- Facet joint capsules.
- Periosteum of the vertebrae.
- Perivertebral fasciae.
- Blood vessel walls.
- Perivertebral musculature.
- Nerve Roots and Dural Sleeves.

Major somatic pain producing stimulus can excite autonomic responses like flushing, drop attacks, etc.

The sinuvertebral or Recurrent Meningeal nerve is distributed only to structures within the neural canal, and provides for pain sensation. The nerve has dual origin at each level, receiving a somatic spinal component and the autonomic component from the cervical sympathetic chain and ganglia. This is one of the reasons why major somatic pain producing stimulus can excite autonomic responses like flushing, drop attacks etc.

BIOMECHANICS OF THE NEURAL CANAL

Flexion/Extension

With forward flexion there is increase in length. The elongation occurs at both anterior and posterior borders of the canal but is greater at the posterior border. As a result the anterior part of the disk is compressed while the posterior part of the annulus fibrosus, the posterior longitudinal ligament, the interspinous and supraspinous and the ligamenta flava are stretched.

The neural canal shortens in extension. The upper vertebra tend to move slightly backwards on the vertebra below and the ligamentum flavum is compressed and bulges anteriorly into the canal, especially when degenerated.

During flexion the interbody joint carries more loads, while during extension the facet joints carry more loads.

The lateral tilting and rotation generally occur in combination in varying proportions, one being more pronounced than the other, depending upon the requirement. The rotation and lateral flexion are often first to be lost during degenerative disease, especially involving facet joints.

Maximum rotation occurs in the C1-C2 level, other levels contributing on smaller scale.

THE SPINAL CURVATURES

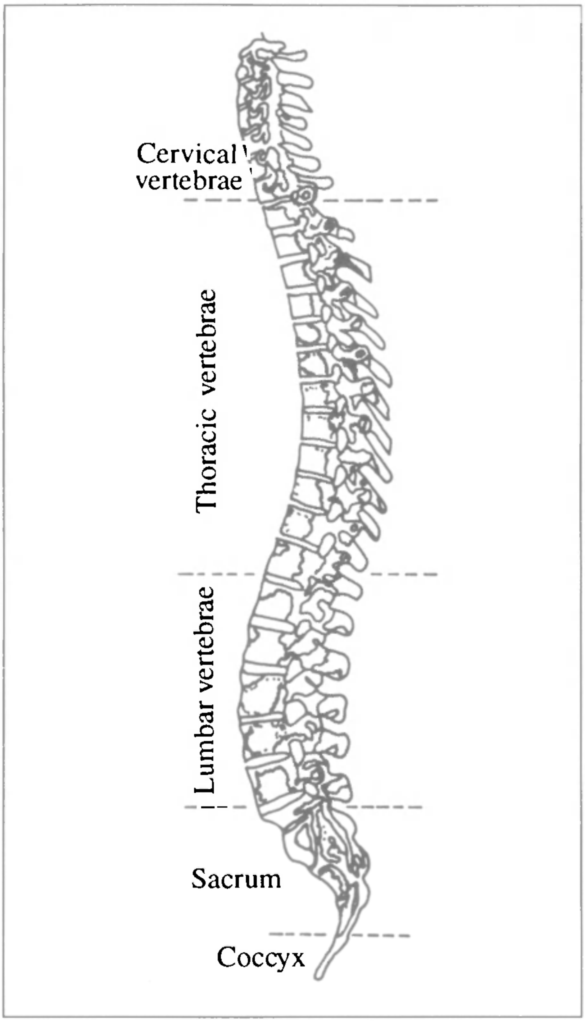


Fig. 5 The Spinal Curvatures

Development of various curvatures of the spine is an attempt of nature to economize on energy expenditure and the mechanical stresses on the spine

The vertebral column is C-shaped at birth with posterior convexity.

With the child's development and learning functions like holding up the neck and standing, cervical and lumbar curves with convexity anteriorly develop.

Muscles immediately surrounding the vertebral column and many even away from it, play an important part in maintaining the biped i.e. the vertical stance of the human being.

Development of various curvatures of the spine is an attempt of nature to economize on energy expenditure and reduce the mechanical stresses on the spine.

Neck and back pains usually arise from over-stressed connecting structures or overused fatigued muscles.

FUNCTIONING OF THE NECK MUSCLES AND STRESSES

All normal muscles are electricity producing tiny generators even at rest

All normal muscles are electricity producing tiny generators even at rest.

The micro-voltages increase with increased muscular tension while functioning.

The **Electro-myography**, i.e. graphical study of the electrical changes, in the para-vertebral muscles reveals many interesting facts. See Figures 6 to 11.

Figs. 6, 7, 8 & 9 Cervical and Lumbar Musculature Function during Common Activities

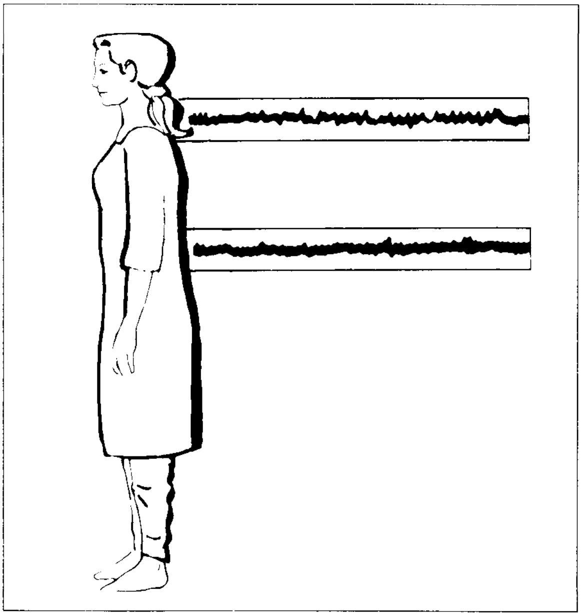


Fig. 6

This lady is standing upright and quiet, but her cervical and lumbar muscles are not quiet.

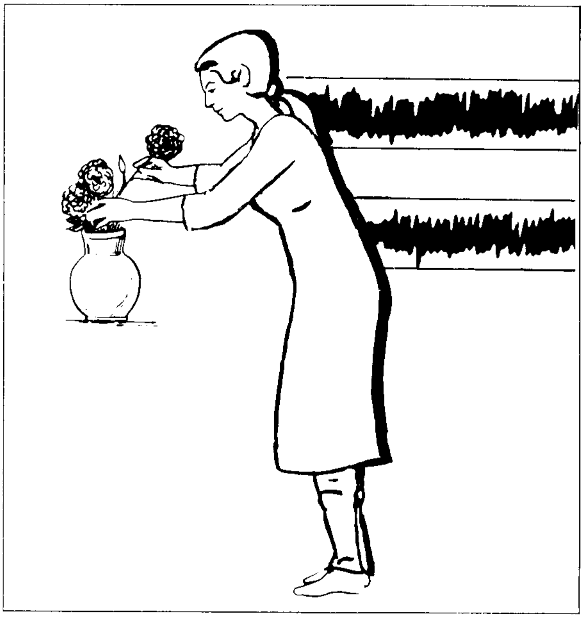


Fig. 8

Another simple action of bending slightly forward to do something at the table level has caused further increase in the electrical activity.

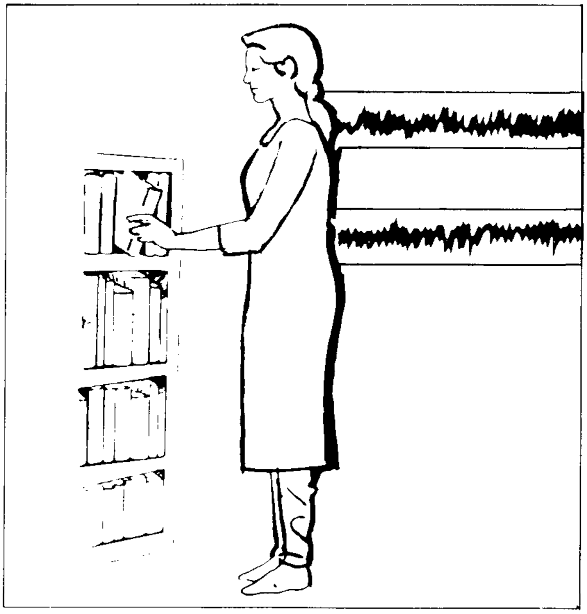


Fig. 7

A simple action of raising her hand shows marked increase in the electrical activity of these muscles.

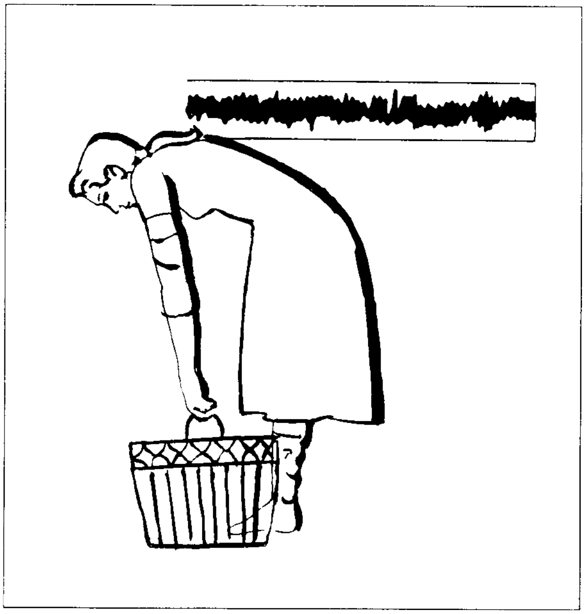


Fig. 9

Her attempts to lift something has suddenly increased the electrical activity.

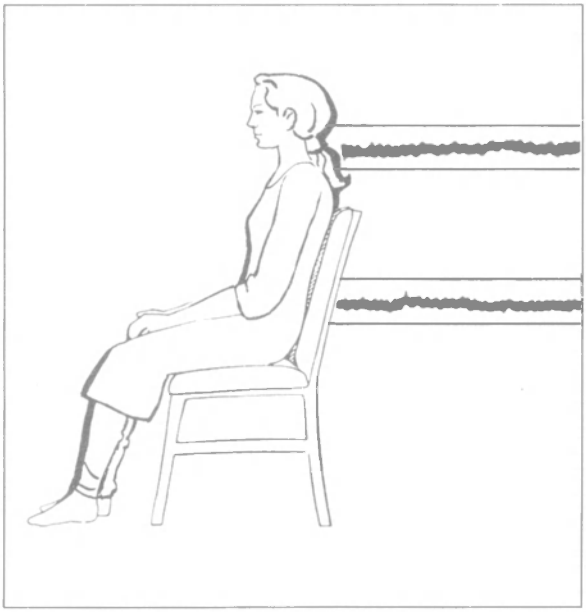


Fig. 10 Cervical and Lumbar Musculature Function during Common Activities

When she is sitting quiet in her chair with her back supported the electrical potentials are not too high.

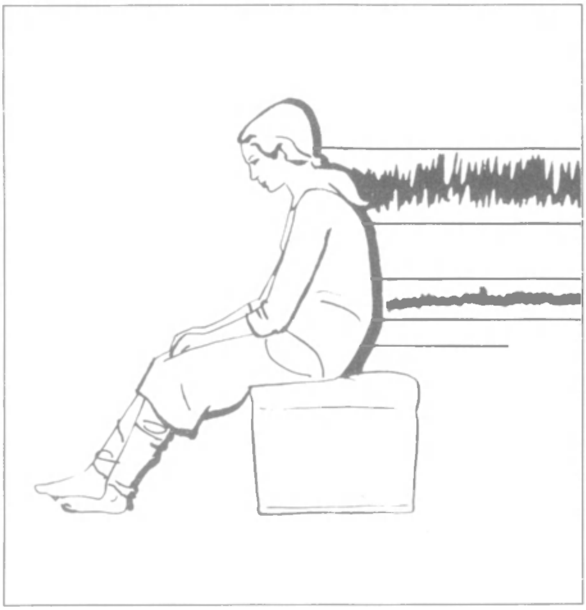


Fig. 11 Cervical and Lumbar Musculature Function during Common Activities

But when she is sitting on a stool with her back unsupported and lifts her arms for any activity, the muscular electrical potentials are very high.

— Normally we are not aware of these happenings but all these muscles are continuously functioning.

— One must appreciate a basic fact that when any muscle contracts, it tries to bring together the points of origin and insertion and creates compressive forces across the joints in between these points.

— If many muscles surrounding a spinal segment contract, they would be, in fact, creating large compressive forces across these spinal segments.

— The average weight of the head and neck is approximately 6-7 kgs. This large globe of the head is anchored to the trunk by a tiny base formed by the lower cervical vertebrae. During normal vertical posture, the centre of gravity of the head lies anterior to the mooring base at C7T1 vertebral articulation. The globe of the head, therefore, has a tendency to fall forward when uncontrolled, like during dozing. When we are awake or are doing normal activities, the cervical lateral and posterior muscles are continuously working to up-hold the head. In other words, these muscles are continuously creating compressive forces on the lower cervical spine, which are many times more than the actual weight of the superstructure i.e. our head.

The neck muscles are continuously creating compressive forces on the lower cervical spine, which are many times more than the actual weight of the superstructure i.e. our head

Since normal muscle-tone, i.e. low grade isometric contraction, would be present even at rest or in a relaxed state, these compressive forces would never be Zero, not even when the person is sleeping and when the gravitational forces are not exerted on the spine.

Strength and Endurance

The spinal column cannot be voluntarily moved or controlled without trunk muscle action, so empirically these muscles must play a role in the prevention and treatment of neck pain.

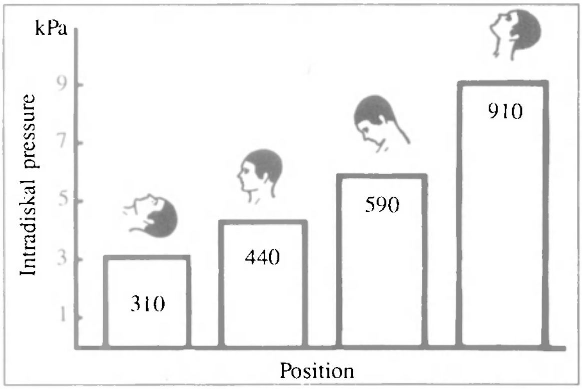


Fig. 12 Lower Cervical Intradiskal Pressures

In patients with neck pain the reduced strength measurements are often seen and this is the result of deficient physiological function. This deficient physiological state may be caused by lack of physical activity performed by the patient or local muscle inactivity imposed by a collar. The tendency of many clinicians and even patients to use cervical collar when not really indicated is only to be condemned. Other potential causative factors for reduced strength output may be pain (perceived or anticipated occurrence), configuration of the spinal column, and lack of motivation.

The tendency of many clinicians and even patients to use cervical collar when not really indicated is only to be condemned

POSTURE

To most people posture would mean a statue-like static stance. It is never so simple.

During every working moment, various parts of the body are continuously sending proprioceptive impulses to the brain. The brain in return is continuously sending motor control impulses to various parts of the body for moment to moment changes in the function of postural muscles. The resultant posture would be the sum-total of these physiological responses.

Biomechanically good posture means a stance in which the spinal structures are stressed least and the energy expenditure by the muscles is minimum. Most patients with neck pains, excepting those in very acute pain, report to be comfortable in relaxed standing position, looking straight ahead. The actual stance of the neck may vary from person to person. I prefer to consider this as a Neutral or Zero position for that individual. This posture when maintained for long time still may not induce stress or fatigue related pains or aggravate the existing pains.

Biomechanically good posture means a stance in which the spinal structures are stressed least and the energy expenditure by the muscles is minimum

The clinical or working posture ideally should be identical or nearer to it. Though this is not always possible, a continuous awareness of it and attempt at maintaining it must be made to stay free from pains. The section on prevention of neck pain includes detailed elaborations on this.

THE REFERRED PAIN

The phenomenon of referred or projected pain is well recognized but not well understood. It is a frequent source of difficulty in identification of the vertebral segments and soft tissues involved and in the correct localization of treatment.

The posterior primary divisions of spinal nerves, supplying areas where muscle, tendon, ligament and capsule are attached to sensitive periosteum in the spine, are considered important in causing referred pains.

Clinical experience of severe and distressing phantom limb pains suffered by some amputees, make the point that 'pain and referred pain are essentially central phenomena.' The Referred Pain 'happens' within the central nervous system, and does not reside 'in' the damaged locality, though it may be perceived so.

The variable distribution of the referred pain is related to organization of the cortical ramifications in the given individual, rather than to the distribution of a particular somatic nerve.

Referred pains occur alike whether the peripheral nerves are present and functioning or whether they are not.

Dermatomes, Sclerotomes and Myotomes

The cervical myofascial referred pain does not follow dermatome, myotome or sclerotome patterns of innervation. Pain is not always distributed to the expected dermatomes, but may spread over a wider area. Pain caused by the irritation of one spinal nerve root may extend in some cases more widely than the recognized distribution. The neurophysiological variations and aberrations can puzzle and mislead a clinician into diagnostic follies. In some cases, the sensory disturbances which are not confined to dermatomal distributions may be seen. They should not be dismissed as hysterical.

> **Pain caused by the irritation of one spinal nerve root may extend in some cases more widely than the recognized distribution**

Fig. 13 shows the most commonly encountered referred pain and Trigger point patterns.

Root Pain or Referred Pain?

Subjective numbness at the ulnar border of the hand, and sometimes diminished sensitivity of ring and little fingers, is often not the result of C8 root pressure. More commonly, it is secondary to scalenus spasm induced by the neck injury or similar pathology.

Mechanical compression alone is not always sufficient to account for the root pain; it is the inflammation which probably plays an important role in its production. The root pain may therefore continue for long after the actual mechanical compromise is eased out.

Severe referred pain need not be due to root compression or root irritation or inflammation. On the other hand, the referred pain which is due to root involvement need not be severe; a many of these patients do not suffer much.

Somatic root compression, as such, may not present as pain. Severe distortion and squashing of nerve roots, by proven bony and/or soft tissue compression, need not produce pain or any detectable disturbance of function.

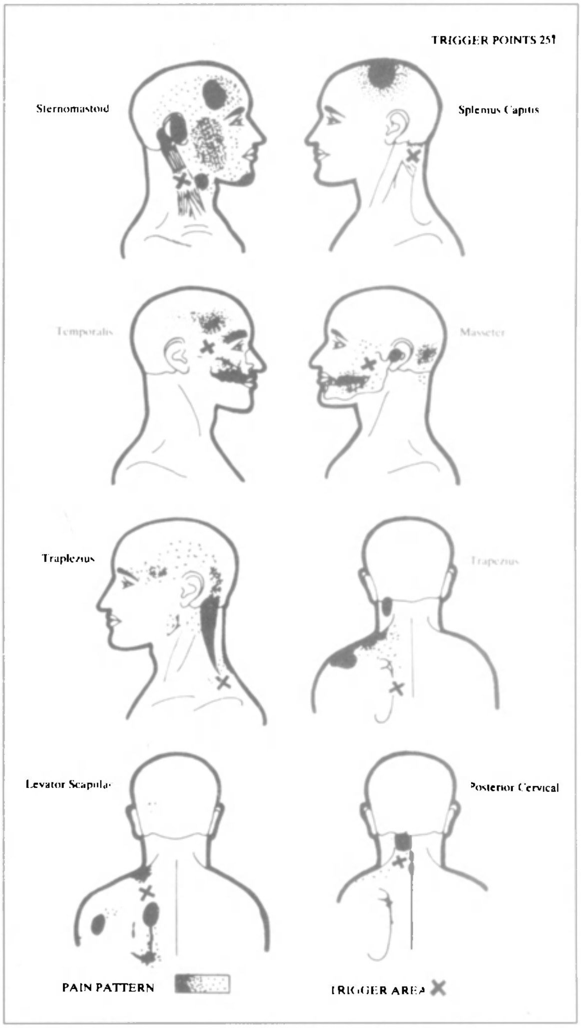


Fig. 13 Cervical Referred Pain and Trigger Points

THE REFERRED TENDERNESS

The word 'tenderness' refers to undue sensitivity of the surface of the body, and/or those structures available to palpation through it, like muscle, superficial ligament, bony point etc.

In a real sense, therefore, most tenderness is 'referred', being elicited by palpation of the body surface when there is no lesion of the surface of the body.

The abnormally enhanced sensitivity can be demonstrated (i) locally over the sight of lesion, (ii) over the surrounding area and (iii) at times quite distant.

Bone

This tenderness may extend far distally, in the so-called 'innervation territory' of the segment(s) concerned, e.g. the lateral epicondyle of the humerus (commonly called Tennis elbow) in cervical degenerative disease.

The tennis elbow rarely occurs because of the game of tennis. It is more often a presentation of cervical spondylosis

Muscle

Localised tenderness in the immediate vicinity of soft tissue giving rise to tender spots is commonly known as 'trigger' points.

They also have associated areas of referred pain and referred tenderness at some distance from these points. The distal referred tenderness disappears as soon as the trigger point is inactivated by local injection or vapocoolant spray and stretch of the muscle concerned.

It is thought that the activity triggered by the primary lesion excites neighbouring areas in the central nervous system to produce heightened sensitivity.

The clinical examples of these Trigger points are commonly seen.

Cervical Headache

The occurrence of referred head and face pain, secondary to abnormalities of the somatic structures of the neck and particularly those of the craniovertebral area, is well known and is discussed elsewhere.

Breast pain

Chronic breast pain in women may be an expression of low cervical radiculopathy. La Bann et al report a group of 18 women with this condition who, after extensive but uninformative investigations which included mammograms and biopsies in some, were successfully treated by cervical traction.

Tietze Syndrome or costochondritis is another presentation of midcervical and lower cervical pathologies.

Chronic breast pain and costochondritis may be an expression of low cervical pathology

In the illustration, X indicates the location of the trigger point and the referred pain is indicated by the black and stippled areas. When the irritable trigger point is in the sternal division of the muscle, pain from it is usually complained of in the stippled areas of the face. When the irritable focus is in the clavicular portion of the muscle, pain is felt chiefly in the ear (indistinguishable from true ear pain) and in the forehead (indistinguishable from other sources of headache) often with a cross-reference of pain to the forehead on the other side.

A patient with such symptoms is shuttled between the consulting rooms or clinics of orthopaedic surgeons, the neurologist, the E.N.T. specialist, the neurosurgeon, the dentist and a psychiatrist without any relief.

Any direct or indirect, obvious or obscure insult to the normal functioning of a pain-prone muscle may produce pain and spasm in it and also make the Trigger point irritable.

In clinical practice, the trigger point is generally diagnosed as the source of pain. As a result of natural resolution or treatment the original cause of pain may clear up, but the irritable trigger spot may continue for long. The patient whose symptoms of pain arise from a Trigger point is unaware of the location of the source of pain. The source itself is not painful to the patient and it is usually at some distance from the patient's pain. Thus, it is up to the clinician to recognize the possibility of cervical disorder as being the cause of Tennis elbow when patient may have no symptoms of any kind related to cervical spine. The treatment in such case needs to be directed to cervical spine. The failure of routine treatment by local steroid injections and physical modalities centred on the lateral epicondyle of humerus and adjacent soft tissues, results from this diagnostic pitfall.

Psychological Aspects of Neck Pain

The human pain experience is a complex multidimensional phenomenon. It involves generation of a stimulus (nociception or sensory factors), patient's taking notice of this nociceptive stimulus in a variety of ways (cognitive factors), his emotional affections and consequent emotional changes (emotional factors), and his reactionary response to these stimuli (behavioural factors).

Pain is largely a psychological response to a nociceptive stimulus. In fact, pain as an objective physical entity cannot be separated from its emotional aspects. In human beings, physical disorders and emotional reactions coexist.

The commonest cause of failure of the treatment and of chronicity or recurrences of neck pain is failure of recognition of these psychological and emotional factors by the treating clinicians

Psychological and emotional factors have profound effect in the phenomena of back and neck pain. The commonest cause of failure of the treatment and of chronicity or recurrences of neck pain is failure of recognition of these psychological and emotional factors by the treating clinicians. It is, therefore, imperative that these aspects of neck/back pains be dealt with properly, even when we don't aspire to be psychiatrists.

Any complaint of physical pain is usually treated by analgesics/anti-inflammatory drugs. This regime generally works in acute short duration pains. The chronic recurrent resistant neck pains require different strategy of management.

Acute onset of pain in the back and neck is often associated with anxiety, and chronic pain is usually associated with depression

In this respect, the Back and Neck Pain can be broadly classified into two groups :

Emotionally Induced Pains: The patient suffers from acute or chronic recurrent, and sometimes severe pain in the neck. However, on examination there is no real detectable objective physical cause. The cause is entirely psychological.

Emotionally Influenced Pains: When a patient suffers from neck /back pain, there is a definite organic cause. However, the emotional factors are responsible for precipitating or amplifying the pain or in causing recurrences.

Acute onset of pain in the back and neck is often associated with anxiety, and chronic pain is usually associated with depression.

Most clinicians believe that pain is a response to a nociceptive stimulus and therefore, the chronic, ongoing pain must be a continuing response to a continuing stimulus. This is not always true. The pain can be a 'Learnt Phenomena', often brought on by variety of unthinkably simple stimuli like loud noise, day to day stress, fever etc. One of the common examples is Trigeminal neuralgia. When such pain appears, it is a haunting memory, as real as its first experience and can be unlearnt by intensive training process.

Pain tolerance varies from person to person and also the resultant complaint behaviour. Pain tolerance is reduced in many medical illnesses

One must realise that pain tolerance varies from person to person and also the resultant complaint behaviour. Pain tolerance is reduced in many medical illnesses like viral infections, debilitating diseases, malnutritional status etc.

Pain perception changes with mood

In any given patient, pain perception changes with mood—same amount of nociceptive stimulus causing large range of pain suffering at different times.

Placebo Effect of Pain Suggestion: It is possible to actually start suffering pain with an anticipated stress or possibility of pain production. It is akin to a patient getting arm pain in anticipation of painful injection like certain vaccinations. Approaching stressful situations like expected guests, overwork, unaccustomed physical exertions, targets, responsibilities etc., are known to induce pain in pain prone patients.

One can recognize psychological disturbances in the uncooperative, noisy and agitated patient, but it is often hidden in the quiet and uncomplaining one. It is in these cases, that the clinician's ability to recognise the patient, whose distress outweighs the recognisable organic pathology, becomes essential. The following coexisting clinical criteria give indication of psychological contribution in the causation of the symptom complex.

Multiple Bizarre Symptoms: Such patients have multiple complaints occurring simultaneously, often unrelated to the affected area, and which cannot be explained on the rational basis of anatomical or physiological systems or on the pathological process. It is not uncommon to see patients who have funniest complaint combinations involving various areas or systems of the body.

Multiple Physician Contact: Very often these patients may have visited several consultants/ specialists for chronic pain or other symptoms either simultaneously or in succession. They undergo large number of investigations (at times, expensive) which usually are normal, therefore noncontributory and non-productive. In the process, they acquire heaps of examination papers and reports from orthopaedicians, cardiologists, E.N.T. specialists, physicians, neurologists etc. They are generally dissatisfied with treatments and seek relief from different medical personnel. Every new unproductive investigation or treatment modality adds to their frustrations and depressions.

Verbosity of Complaints: The descriptions of the illnesses of such patients are verbose and exaggerated. They never suffer from simple, minor degrees of pain and other discomforts.

— Many have a bias towards treatment modalities like 'Intolerance to Allopathic medicines,' tractions, local injections, etc.

— Intolerance to noise, bright light.

— Many have undergone procedures like tubectomies, vasectomies, hysterectomies or even lumbar punctures, and the complaints are alleged to have started since then.

— Some have high urgency demands stating that they are suffering too much and need urgent out of turn appointments or examinations. They demand urgent treatment and relief. It is not unusual to find clinicians irritated with such patients since their examinations yield almost nothing worthwhile.

— Many have persistent hiccoughs and some have Aerophagy.

— Some patients' clinical examination elicits superlative response to pain and tenderness, and mobility testings, as noticed by their exaggerated gesticulations, grimaces and exclamations, than one would expect from other normal subjects.

— Many may show funny sensory affections and some feign motor weaknesses. It is possible to divert their attention and find a change in these clinical signs.

— Many have unrealistic expectations from the clinicians and the treatments. Some have overtly expressed frustrations on residual pain, stiffness or sensory symptoms. Many mis-interpret and overreact to residual symptoms and presume themselves to be suffering from malignancy or tuberculosis or some other dreadful disease.

— Many have somatic preoccupation and keep examining themselves frequently. They imagine and claim to note smallest happenings in their body and insist on these being significant.

— Many have variety of phobias and apprehensions about normal day to day activities and body functions.

When the patients' suffering causes major disruption in their lives and when not restricted to themselves and involves others, it should be called 'NECK/BACK DISABILITY'

Now and then clinicians find patients who have major disruptions in their normal life, like chronic absenteeism from work or shirking other responsibilities. In these circumstances, not only the patients are suffering but also the people around them in and outside their homes. When these patients' suffering is not restricted to themselves and involves others, it should be called ' NECK/BACK DISABILITY '.

Contrary to the common belief, the patients even in private practice settings do not mind their cases being discussed by a team

Going by the WHO definition of health, it is important to treat the patient as a whole rather than a disease specimen in isolation. The aims of treatment in these patients should be to alleviate diseases, relieve stress, reduce illness behaviour, and restore social function. The treatment of such chronic recurrent or resistant neck pain in the patients is best achieved through the multidisciplinary team approach. Contrary to the common belief, the patients even in private practice settings do not mind their cases being discussed by a team. In fact many express their satisfaction over the concerted efforts by more than one clinicians. This also saves time, minimises the risk of side-tracked treatment, removes individual bias, and allows a more intelligent treatment plan to emerge. This team approach also prevents shunting of the patients from one specialist to another as it tends to happen in large general hospitals.

At the ' Spine Clinic' of L.T.M. Medical College and Hospital, Sion, Bombay, between July '85 & March '87, 175 patients with neck/back pain were interviewed for Psychosocial evaluation. All these patients, as a routine, were seen by a team of orthopaedic surgeons, physical and occupational therapists, and a medical social worker. Help was also taken from prosthetists, neurologists and psychiatrists.

Many psychological and social factors are found to operate in patients suffering from neck pain

Many psychological and social factors were found to operate in such patients.

Age: Earlier the onset of back /neck pain, higher are the chances of it becoming chronic, except when objective and satisfactory treatable physical causes are found. Children who complained of chronic recurrent neck pain showed high incidence of becoming adult pain subjects. It is important that a child during his development acquires healthy objective attitude towards the pain phenomena. The pain prone behaviour and attitudes of family members, and the pain related pampering is often responsible for children presenting with headaches, abdominal pains and neck/back pains.

Sex: As with many psychosomatic illnesses, females show higher incidence amongst the neck pain sufferers.

Community and Culture: Ethnic influences determine how one or another group of people with different origins responds to pain. In the above study as well as in another study conducted in private practice set-up, certain communities were found to be having large percentage of psychosocial neck pains, though no social group was found to be immune to these.

The other psychosocial factors that influence neck pain, included educational level, socio-economic status, marital status, joint family stresses, etc.

The personal factors found responsible were unemployed spouse, addiction or illness in spouse, illtreatment by spouse, sterilisation procedures, hysterectomy, male and female menopause and loneliness. Many have a close family member or an associate suffering from chronic resistant neck pains.

Job related factors were unemployment, job dissatisfaction and temporary jobs. The industrial labour problems like lay offs, threat of dismissal, harassment by other employees, and union rivalry problems caused neck/backache in employees and in their family members. Rewards for pain behaviour reinforced it. Without realising it, patient may subconsciously make his pain worse because of secondary gains. It gets him the added attention of his family and friends. Pain can be used to avoid an unpleasant situation. After repeated failures, pain can be a face saving reason for giving up a loosing fight. The gain may be financial — through litigation or the compensation he gets as a disabled person could be higher than his present salary.

The analgesics drugs have little role in patients suffering from chronic neck pain. The drugs most useful in prolonged doses are anti-depressants

Treatment: In acute painful situations analgesics, muscle relaxants and anti-anxiety drugs are needed. But they must be stopped as soon as possible.

The analgesics drugs have small, short and temporary role in patients suffering from chronic neck pain. The patients are often addicted to drugs like dextropropoxyphene and diazepams. It is necessary to wean off them. The drugs most useful and needed in prolonged doses are anti-depressants of different types, with short courses of adjuvant analgesics and other pain relieving physical modalities.

For many a patient suffering from chronic neck pain, every new modality of treatment, whether it is drugs, injections or physical therapy, brings relief for some time. This effect of treatment (probably placebo) may soon disappear.

The most realistic goal of the treatment is to enable the patient to cope more effectively with continuing physical discomfort and disability by enhancing his coping capacities. This is done by using Behavioural Modification Therapy.

This therapy aims at training the patient to give up his pain habits, to avoid self defeating patterns of thought and behaviour, to respond more adaptively, and to create conditions conducive to his own well being by learning healthy patterns of adjustment. This normally would require a help of a psychosocial counsellor.

Understanding Neck Pain and Related Problems

ACUTE CERVICAL PAIN SYNDROME

In simple terms, this would mean any condition in which pain forms the predominant presenting symptom. This is most often seen in cases of cervical disk affections, in young or middle aged adults. Rarely it can be due to subluxation and locking of degenerated unstable facetal joint.

BRACHIALGIA

Brachialgia means symptoms and signs along the brachial plexus nerves like Sciatica would mean neurological symptoms and signs along the distribution of sciatic nerve

In simple terms, Brachialgia means symptoms and signs along the brachial plexus nerves like Sciatica would mean neurological symptoms and signs along the distribution of sciatic nerve. Like any other neuralgia this could occur due to disturbances in the pyramidal tract, the motor neuron, the root or in the surrounding vertebrae.

ACUTE CERVICAL DISK HERNIATION

The annulus fibrosus of the intervertebral disk can tolerate isolated bending stresses quite well, but it can withstand isolated rotational or twisting stresses poorly. When rotational stresses are combined with deformations in other directions, the annular fibres can rupture quite easily, especially when the intradiskal pressures increase. This can happen during many common actions like lifting heavy weights, violent coughing, sneezing or in jolts and jerks while travelling. These mechanical stresses cause tears in the layers of the annulus fibrosus. This damage varies from insignificant small cracks to major sizeable disruptions. The nucleus pulposus because of its jelly-like consistency and because of the compressive loads on it starts bulging towards and sometimes through the damaged area of the annular fibres. If the break in the annular fibres is major, the nucleus pulposus pushes itself outside behind the flimsy intact layers of annulus, both together forming a bulging mass. This is the Disk Herniation. This pathology is quite erroneously addressed as 'Slipped Disk'. The disk does not 'slip', only its nucleus herniates.

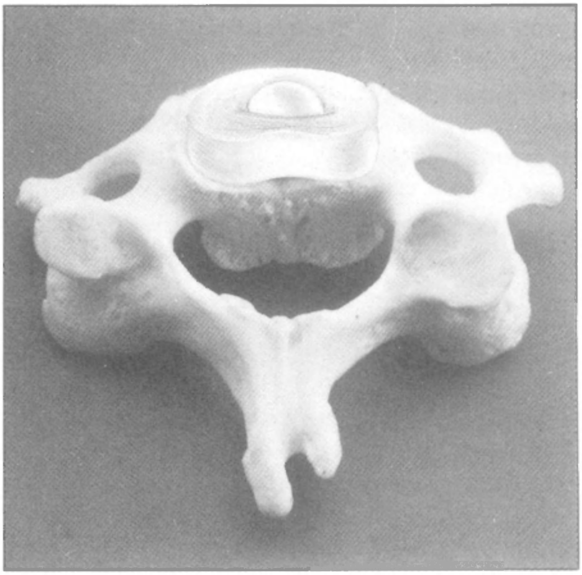


Fig. 14 Cervical Disk Herniation

The Disk Herniation is quite erroneously addressed as 'Slipped Disk'. The disk does not 'slip', only its nucleus herniates

The body immediately tries to protect the injured area and prevent its potentially harmful movement by throwing the surrounding muscles into spasm. This muscle spasm is not the primary cause of pain as is commonly believed, but, in fact, is an indication of protective response by the body for some underlying pathological painful event.

The muscle spasm is not the primary cause of pain as is commonly believed, but, in fact, is an indication of protective response by the body for some underlying pathological painful event

Persistent spasm of the muscles, may secondarily produce pain in some cases. Pain may sometimes arise insidiously after an episode of local strain, perhaps only when the injured annulus develops traumatic oedema. The annular fibres injured in this manner usually belong to posterolateral and posterior paramedian sectors of the disk. In due course, reparative processes bridge the breech in the annulus and the acute pain and other symptoms subside. However, the reparative fibrous tissue scar has poorer tensile strength and can get injured by even smaller mechanical stresses the next time. The natural history of a disk protrusion tells us that it shrinks in size. Recurrent herniations may not shrink sufficiently and may continue to create intraspinal space encroachments.

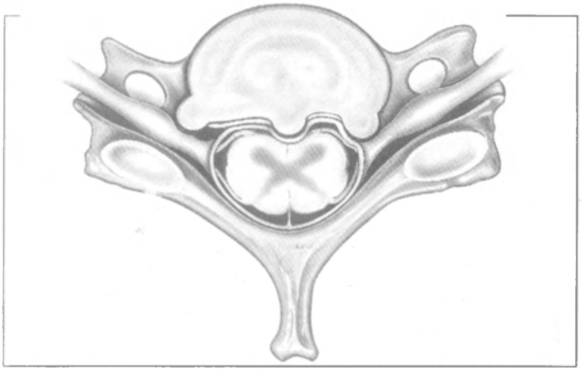


Fig. 15 Various Locations of Cervical Disk Herniations

The natural history of a disk protrusion tells us that it shrinks in size

The exact location of a protruded cervical intervertebral disk is clinically important. A laterally placed herniation — the commonest — will give rise to a pure root syndrome; a paramedian one may also impinge on the spinal cord, thus producing the mixed syndrome of cord and root compression, sometimes starting with root symptoms and progressing to cord compression or vice versa. The more centrally placed protrusion may involve the entire width of the cord or only its ipsilateral columns, causing clinical features of an extramedullary intradural pressure on the cord. These herniations are usually very small, especially in comparison with lumbar herniations. The local peculiarities of the anatomy (discussed earlier), make the patient suffer earlier and to larger degree. Occasionally, one comes across patients with multiple level protrusions.

Clinical Features

The patient may have sustained insignificant trauma to the neck. Some patients may report a major attributable trauma.

1. Pain. The onset of pain is often gradual but frequently the patient awakes from sleep with pain suggesting some inadvertent trauma. Pain may be in the form of neck stiffness, with or without an ache in the head on movement. In others, pain is referred to the shoulder girdle and may precede pain in the neck and frequently runs posterolaterally across the shoulder and down the outer aspect of the arm and forearm involving the fingers and thumb. Less often, paraesthesia in the fingers may be a precursor of pain. The discomfort and ache in the early stages may often progress rapidly to marked stiffness of the neck, with or without a lateral tilt. All movements are frequently restricted by spasm, and aggravate pain in the upper limb. This pain is usually of a dull and gnawing character, not strictly localized but very persistent and with superimposed lancinating pains especially on head movements. It is frequently aggravated by coughing or sneezing and by jolting of the body. The distribution of pain gives a clue to its origin.

2. Paraesthesia. These almost invariably occur in the cervical herniations at a very early stage of the disease in the form of a feeling of numbness, tingling or deadness and are usually referred to the fingers and thumbs. Like pain, they are aggravated by neck movements and, not infrequently, by increase of intraspinal pressure.

During recovery it is common to find increased paraesthesia and even hyperaesthesia. This is often interpreted by the patient and some clinicians as an indication of deterioration, when they, in fact, indicate behaviour of the recovering neural tissue

3. Sensory Depression. It is a frequent accompaniment of cervical herniation, though often in the more advanced stages of the syndrome. Sensory deficit in a dermatome as opposed to that of a peripheral nerve area simplifies the differential diagnosis. The posterior column sensation such as a proprioception and vibration sense are usually normal. The sensory deficits usually recover over a long period. This delay in recovery of sensations, especially in the fingers, may be a cause of great worry and concern for some patients. During recovery it is common to find increased paraesthesia and even hyperaesthesia. This is often interpreted by the patient and some clinicians as an indication of deterioration, when they, in fact, indicate behaviour of the recovering neural tissue.

4. Motor Affections. A large spectrum of motor affections, ranging from only subjective weakness in a small area to major motor loss over a large part of upper extremity, may be seen. Many patients describe inability to hold objects in the hand and are afraid of dropping them due to weakness of pinch, grip and grasp. The triceps are also commonly involved in motor loss. After appropriate and prompt treatment, most muscles recover their strength to earlier levels. However, residual deficits in endurance of involved muscles, is not uncommon.

The treatment of acute cervical disk herniation consists of enforced rest to the neck

The treatment of acute cervical disk herniation consists of enforced rest to the neck. This is best achieved by hospitalization and continuous cervical traction. This modality works very quickly and gratifyingly. Adjuvant use of analgesics, anti-inflammatory drugs and sometimes muscle relaxants, is needed. Severe pains indicate nerve root oedema and may dictate use of large doses of corticosteroids given systemically. The residual local and neural symptoms and signs take many weeks to recover. During this period the patient may need protection and rest offered by cervical collar. The patient must be clearly told that the collar is essentially a short duration help and should not be used as a permanent physical and psychological prop.

The recurrence of local and neural symptoms and signs is not uncommon. This would need repeating earlier treatment regimes with generally satisfying outcome.

Only rarely is surgery needed in acute stage. Major radicular or cord involvement would indicate need for surgery. Surgery of cervical disk is often required for chronic resistant sufferings.

ACUTE FACETAL LOCKING

This is seen in patients who have already developed generalized or localised degenerative changes. The patients complain of pain and inability to move their neck, often following prolonged unsuitable neck postures. This could be as simple as unaccustomed prolonged posture, sleeping with unsuitable pillow etc. This unsuitable posture usually has a component of forced rotation coupled with lateral tilting or flexion. The patient often needs to support his neck with hands and has progressive discomfort. Brachialgia is only rarely associated. The actual pathology is a minor subluxation of a hypermobile facet joint components leading sometimes to local effusions and pain. The locking may spontaneously disappear or the patient's or somebody else's attempts at mobilising his neck may unlock it. Following this there is rapid decline of pain and spasm. The local soreness and stiffness may linger for few weeks. Some patients learn manipulative jerky movements of the neck. They keep doing these, even when not needed and may damage the structures more.

Treatment consists of a gentle unlocking preferably done by prolonged traction rather than manipulation. This is to be followed by developing range of motion control and muscular strength and agility. Occasionally, local steroid injections may be needed to reduce oft recurring synovitis. Routine drugs and physical therapy modalities will have to be used as per requirement.

OTHER ACUTE PAIN PRODUCING CONDITIONS

The deep cervical lymphadenitis secondary to naso-oral infections is commonly seen in children. The proximity of these inflammed nodes to the nerves and vertebral periosteum may throw deep cervical muscles in spasm and pain. The pain and spasm subside with the inflammation of the nodes. The treatment appropriate to the primary cause would resolve this pain.

The other causes include destructive lesions of the vertebrae like tuberculosis, tumours and occasionally viral neural infections.

CERVICAL DEGENERATIVE PROCESS—SPONDYLOSIS

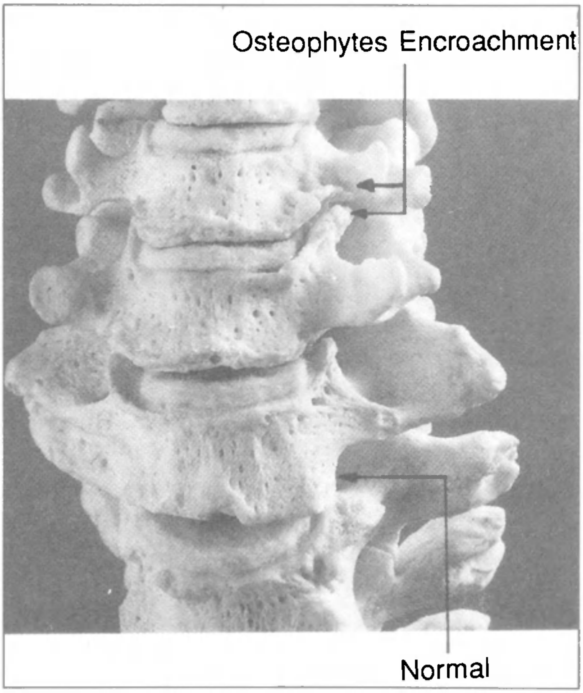


Fig. 16 Degenerative Changes in Cervical Vertebrae

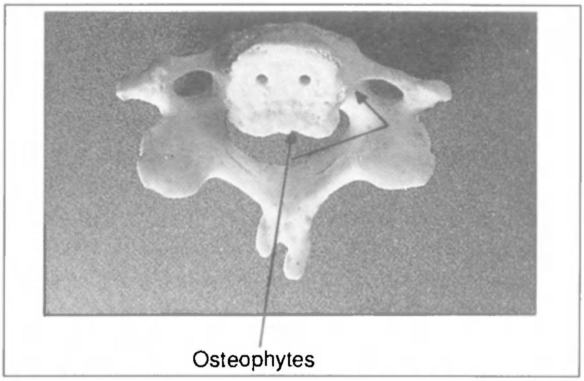


Fig. 17 Degenerative Changes in Cervical Vertebrae

Greying of hair, menopause, need for spectacles in middle age, development of cataract — all are considered as normal ageing processes of the body. The similar ageing changes in the vertebral column are given the name CERVICAL SPONDYLOSIS. Therefore, cervical spondylosis is not a disease but a stage in human life. Ageing process causes clinical suffering to some and may cause none whatsoever to others. The histological changes or even the radiological changes detected do not go parallel with clinical pain; many patients with advanced changes have never suffered clinically. Very often patients come to us with short duration symptoms but the radiological changes seem to be of long duration. This means there was a stage when this patient did not have pain while having degenerative changes. The treatment aims at taking the patient back to this asymptomatic stage.

Cervical Spondylosis is not a disease but a term used to describe normal ageing changes in human cervical spine

The lumbar spine has to tolerate major stresses of load-bearing while the cervical spine is subjected to major stresses and strains of mobility. In any spinal region the stresses of mobility are always greatest at the junction of the mobile and nonmobile spine. Consequently, the lower cervical regions (C5C6, C6C7, and C7T1) undergo early and more extensive degenerative pathological changes. The disk injuries and disk herniations are most common here. Also the anteroposterior diameter of the intervertebral foramina is smaller in the lower cervical region.

The spinal cord in the lumbar region is fairly mobile and can move away from the posterior aspect of vertebral bodies and disks if pushed by the herniating nucleus, bulging annulus or any osteophyte, the only limiting factor being the posterior wall of the spinal canal. The cervical cord is anchored to the anterior bony wall of the cervical canal by dentate ligaments, which reduce its free posterior mobility. Even a small encroachment in the cervical canal from front may cause early and sometimes severe symptoms and signs of root and cord involvement.

The radiological detection of reduction in disk height in a patient would indicate long existing degenerative process

The shock absorbing and motion controlling/ modulating function of the nucleus pulposus depends largely on its water content. Normally the nuclear colloids are high molecular ones and have high water adsorption capacity. As a result of ageing and degeneration, these are replaced by low molecular colloids which have lower or poor water imbibing properties. Consequently, the drying (?) nucleus, loses its excellent properties. This change also brings about loss of homogenicity of the nuclear material. leading to cracks, fissures and fragmentation of the nucleus pulposus. The annular layers are normally held under certain tension by the jelly-like nucleus. With the ageing process the annular layers also lose their tensile strength. There is resultant loss of vertical height of the disk material. This process is never an acute short duration phenomena. Clinical or radiological detection of reduction in disk height in a patient would indicate a long existing degenerative process.

Normally the water content of the disk continuously changes with its geometry, imbibing and exiting quickly, as per requirement. With histochemical changes of degeneration in the nuclear colloids, this rate of water movement slowes down. This causes resistance to change of disk geometry, associated with movements of the spinal segments. Clinically, this manifests as post-rest stiffness and is an indication of early degenerative changes. Many patients who complain of morning stiffness or painful stiff neck after prolonged unchanged postures like while reading and writing, are undergoing these degenerative changes.

The degenerative changes in this cohesive three joint complex (i.e.interbody disk joint and two posterior facet joints) may throw the biomechanically efficient mobility pattern into an erratic disadvantageous painful motion pattern. This altered abnormal motion may cause accelerated degeneration and may induce painful hypermobility, sometimes leading to instability.

The osteophytes broaden the area occupied by the vertebral bodies and are a natural attempt at stabilizing hypermobile motion segment

The annulus buckles outwards with the approximation of the vertebral bodies. The stretch on the junctional periosteum at the attachments of these annular fibres induces new bone formations which are seen as the osteophytes or lipping on the X rays. These osteophytes, in fact, broaden the area occupied by the vertebral bodies and are a natural attempt at stabilizing hypermobile motion segment. They can grow anteriorly almost without causing any symptoms.

They can grow posterolaterally in the root canal or posteriorly into the cervical canal causing root or cervical cord irritation or compression.

When the vertebral bodies come nearer, it causes the facet joints to bear higher loads and they wear out early. This is clinically manifested by pain and stiffness during facet joint function. The irritation of the synovial membrane causes repeated effusions and painful stretching of the facet joint capsules. Over a period of time this could lead to laxity of the capsule.

On the other hand, the degenerative arthrosis may induce broadening and thickening of the facet complexes, with osteophyte formation similar to those from the body. This could compromise the spinal canal or the intervertebral foramen from behind. When this compromise in the dimensions of the canal causes neural tissue symptoms and signs it is called **Spinal Stenosis.**

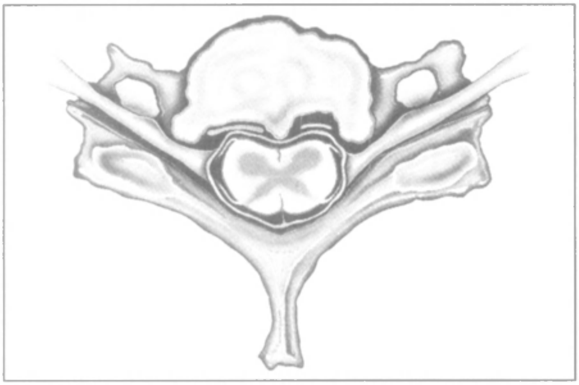


Fig. 18 Cervical Canal Stenosis

Thus the nerve roots get pinched between the two bone projections and only minor trauma is required to produce nipping and neck and nerve root pain. At any time during this process minor trauma, which may occur during sleep, may cause an acute prolapse of the nucleus pulposus through the annulus fibrosus posteriorly, laterally or centrally.

The chronic irritation to the nerve roots may cause thickening and hypertrophy of the root causing further difficulty. This is also thought to be due to chronic compressive ischaemia of the root (Chronic radiculitis).

In the similar manner involvement of the spinal cord may occur, and this may be manifested by alteration of trunk sensation and reflexes and alteration of muscle tone, vibration sense and proprioception in the lower limbs (**Cervical Myelopathy**).

Gradual onset of myelopathy is believed to result not from any sustained compression of nerve or neural tissue but from repeated movements of the neck causing pressure by the intervertebral disk on the anterior spinal arteries, particularly between C5 and 6, and C6 and 7.

Multiple disk degeneration might involve the medulla of the cord so that there could be motor disturbance due to pyramidal tract involvement in both the lower extremities with hyperspasticity, hyper-reflexia and extensor plantar responses.

SHOULDER PAINS

Pains arising from the shoulder joint and the structures surrounding it are often a source of confusion

Pains arising from the shoulder joint and the structures surrounding it are common and are often a source of confusion. The usual causes are sprains of rotator cuff and degenerative disorders. These are often associated with effusions in the sub-acromion bursa, lying between the humeral head and the bony arch formed by the clavicle and acromion process of the scapula. Except the post-traumatic sprains and acute calcification in the rotator cuff with subacromial effusion, all other pains arise insidiously, generally present around the head of the humerus and may radiate over deltoid region and down to the elbow on the lateral aspect of the arm. The tenderness locally, distal to the acromio-clavicular arch, would indicate the pathological tissue underlying. Occasionally there could be tenderness along the bicep's long tendon lying on the anterior surface of the humeral head indicating tendinitis. Pain would be elicited on forced resisted actions of these muscles. In rotator cuff degenerative pain, initial abduction would be painless; between the arc of 60 deg. to 110 deg. it would be painful; the further abduction may be free and painless

(painful arc syndrome). The shoulder rotations are generally free and painless, except in an acute stage. Any tenderness on top of the acromio-clavicular arch and proximal to it, is generally of cervical origin. The pain around the shoulder region could be C5 radicular pain. This generally causes great discomfort, is of acute onset and is aggravated by cervical movements and coughing/sneezing. The shoulder movements rarely worsen this pain.

PERIARTHRITIS SHOULDER

Periarthritis of the shoulder, also called frozen shoulder, is seen most commonly in diabetics and in patients following any major medical or surgical episode

Periarthritis of the shoulder, also called frozen shoulder, is seen most commonly in diabetics and in patients following any major medical or surgical episode. This may include large spectrum of illnesses like acute or sub-acute cardio-pulmonary disorders, infectious fevers, herpetic disorders, cardio-thoracic surgery or even acute anxiety status and depressions. Diabetics have high probability of bilateral affections, either simultaneously or in close succession. The problem may start with minor local or adjacent trauma or sometimes the problem starts for no discernible reason.

The shoulder girdle has many layers of soft tissues all around it and these move in various directions in relation to each other.

Periarthritis is a autonomic fibro-vascular disturbance causing inter-muscular exudations which form adhesions with each other and reduce free excursions. There is a progressive increase in pain and progressive loss of mobility in all the directions. The inflammatory pain of initial stages soon subsides and is replaced by pain due to stretching of the stiff and tight shoulder structures. This lingers for a period varying between few weeks and many months. The loss of rotation, especially external rotation, is the key to the diagnosis and also to show any recovery. Cervical pains are often relieved by resting the neck by simply holding it for some time or by properly resting it on a pillow. This does not happen with shoulder-originating pains.

CERVICAL HEADACHES

It is estimated that among the patients with headaches that one sees in day to day clinical practice, 15-20% of benign headaches are vascular in origin, with the remaining 80 to 85% being placed under many diagnostic categories. These include tension and psychogenic headaches, headaches associated with depression, fatigue, hypertension etc. However, there are a good number of cases that are associated with disorders of the structures of the cervical spine.

Generally cervical spine as a cause of headache is unrecognized by most clinicians

Generally cervical spine as a cause of headache is unrecognized and neglected by most clinicians. This commonly happens because the actual cause of headache can be obscure and there are no established clinical diagnostic guidelines by which the cervical spine can be reliably differentiated from other causative areas of headache.

The incidence of headache with the clinical evidence of affection of upper cervical spinal segments, especially the facetal joints, is found to be quite high. On the other hand, patients with cervical pain who have no headache most often show affections of lower cervical segments.

The involvement of the upper cervical levels in patients with headaches can be explained well on the basis of the neuroanatomical interconnections between the spinal nucleus of the trigeminal nerve, which subserves pain sensation to the face, and the upper three to four cervical spinal nerves. The cervical headaches occur generally in occipital or temporal regions, and rarely in frontal regions. Depending upon the intensity of nociceptive stimulus, the headache can spread to the top of the skull. Pain on the top of the skull vault, without pain in other areas of head and neck, are often of psychosomatic origin.

Many diseases of the neck are associated with headache. In some, the primary spinal source of pain is known, while in others it may be obscure. But the clinical features of headache may indicate upper cervical source. The conditions which can cause cervical headache include congenital anomalies like Atlanto axial subluxations, degenerative disorders, rheumatoid arthritis, traumatic, infective or neoplastic diseases.

The treatment appropriate to the cause of cervical trouble generally relieves the headaches.

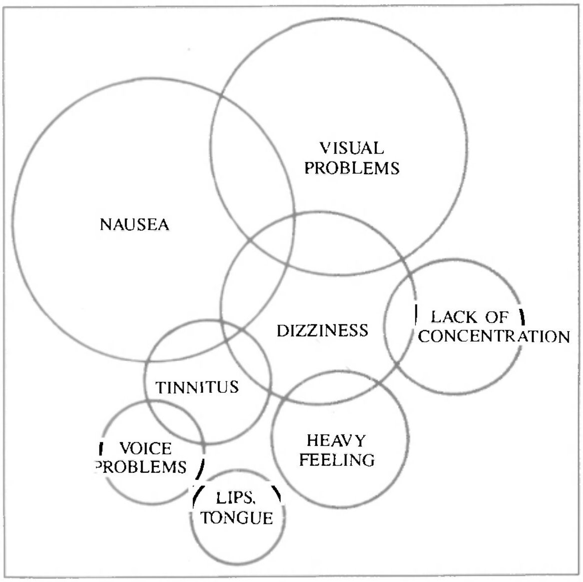


Fig. 19 Cervical Dizziness and Associated Symptoms

CERVICAL DIZZINESS /VERTIGO

The vestibular nuclei receive their blood supply from variety of sources. These several vessels are all derived from vertebral and basilar arteries — the basilar itself being formed by two vertebral arteries. The vertebral arteries reach the brain stem from subclavian arteries after a long course which is intimately related to the cervical vertebrae. If the blood flow in any of these vessels supplying vestibular nuclei is critically reduced, vestibular functions are impaired and dizziness occurs. Since these arteries supply to other important areas of brain stem, dizziness is often associated with other symptoms like disturbances of vision, diplopia, nausea, ataxia, 'drop attacks', difficulty in speaking, various sympathetic disturbances and variety of motor and sensory affections. Whatever the combinations, dizziness is the most predominant symptom.

Patients having Vertebro-Basilar Insufficiency are always afraid of a fall during a giddy spell, although this rarely ever happens.

Dizziness is usually precipitated or aggravated by rotations of the neck which causes kinking of one vertebral artery, while the other has compromised flow for some intrinsic or extrinsic reasons. These patients having vertebro-basilar insufficiency are always afraid of fall during a giddy spell, although this rarely ever happens. The commonest site of compression is C5C6 region. The other factors like atherosclerosis, already compromised or degenerating neural health also contribute to the symptoms.

In most cases the symptom complex lingers for a variable period and either reduces or disappears probably due to local vascular readjustment in the flow. Rarely surgery is indicated to decompress the vertebral arteries at the location of compression by bony or fibrous elements.

CARPAL TUNNEL SYNDROME

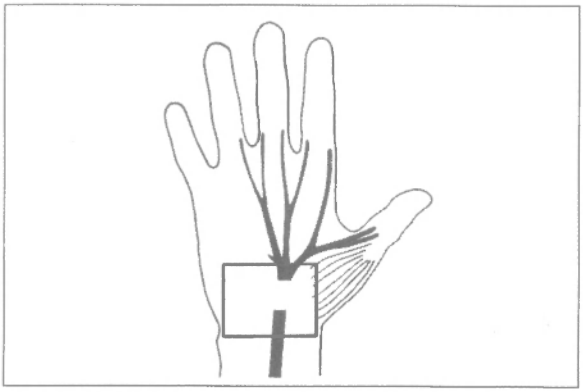


Fig. 20 Median Nerve Compression at Wrist

Pain and paraesthesia in the palm can be due to cervical cause and not necessarily due to median nerve compression at the wrist

Pain and Paraesthesia in the hand is the main presenting symptom of median nerve compression at the front of the wrist. The median nerve along with the long flexor tendons of the fingers passes through a fibro-osseous tunnel formed by a curved row of carpal bones and an overlying tough, broad fibrous band of flexor retinaculum. Normally these structures coexist and function comfortably. If for some reason these structures have crowding and resultant increase in the pressure in this compartment, the tendons being tough structures and relatively hypovascular, do not suffer. The median nerve, structurally delicate and with easily compressible supplying blood vessels, suffers ischaemia and neurogenic symptoms are produced. These include pain, Paraesthesia, alterations in the sensory functions along the distribution of the median nerve i.e. along the thumb, index, middle and adjacent half of the ring finger. The muscles of thenar eminence which cause flexion and abduction of the thumb, may show motor affections of varying degree. The symptoms are generally precipitated by keeping the hand in dependent position which brings about local vascular congestion. The symptoms are sometimes brought out at night. This discomfort precedes motor symptoms which include inability to perform fine movements, clumsiness and loss of tactile gnosis.

Local fluid retention appears to be the most important precipitating factor. This condition is common during pregnancy, pre-menstrual period and systemic conditions characterized by fluid overload like cardiac failure, renal failure and myxoedema. The patient is mostly a female in her 40s or 50s. Such patients often have relatively smaller carpal tunnels.

A sphygmomanometer cuff placed around the arm is inflated above systolic pressure and this reproduces the patient's symptoms within a minute. This condition is often confused with associated degenerative osteoarthrosis of the cervical spine, thoracic inlet syndrome, peripheral neuropathy as all these have similar symptoms. The electrophysiological studies are useful as they often help in localizing the site of compression. The most conclusive finding is the demonstration of a reduced conduction velocity in the median nerve as it crosses the wrist. The normal conduction velocity for motor nerve fibres is 50m per second, and speed below 40m per second should be considered suspicious of partial nerve block in the carpal tunnel, and values below 30m per second are diagnostic of the carpal tunnel syndrome.

The treatment depends upon the presence of a recognizable associated condition. A short course of diuretics in fluid retention states may help, so also the rest in a wrist splint. For the majority, whose carpal tunnel syndrome is of idiopathic etiology, relief may be achieved by injecting an anti-inflammatory agent into the carpal canal. In some patients this may give lasting relief or a major reduction in symptoms for variable period. For patients with poor relief or recurrent symptoms the definitive treatment for the carpal tunnel syndrome is surgical division of the carpal ligament. Surgery may relieve some patients promptly, while others, especially with prolonged median nerve compression, may show very slow and sometimes incomplete relief.

CERVICAL RIBS

Detection of cervical rib on radiographs has created neurosis in many patients

Detection of cervical rib on radiographs has created neurosis in many patients. These cervical ribs, in most cases, happen to be small innocuous projections from the front of C7 transverse processes. They rarely cause symptoms and signs except when they are very large and joined to the first rib either directly or through a fibrous band. The lowest trunk of brachial plexus (C8-T1) lies in the subclavian groove on the upper surface of the normal first rib. A large cervical rib with fibrous band attached to the first rib may elevate this lower brachial trunk which is already tautly stretched

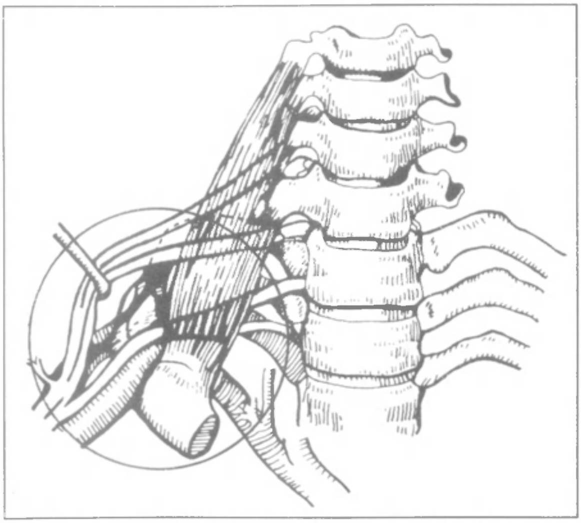


Fig. 21 Cervical Rib

over the rib. This may cause interference with its conduction and the function. It can occur when the growth is completed in the 30s and the nerve is fully stretched. It can also happen in later years when there is drooping of shoulder girdles for various reasons like ageing or psychological factors.

There is local crowding created by scalene muscles, the elevating rib and drooping shoulders, which is responsible for the symptoms.

The commonest clinical presentation is numbness on the ulnar side of the forearm and wasting of the small muscles of the hand. There could be circulatory changes such as coldness, cyanosis, oedema due to mechanical vascular compression or due to irritation of sympathetic fibres.

Most patients with cervical ribs have cervical spine problems as the source of pain. The treatment needs to be directed to the cervical problem

In very few patients, the cervical rib is really the cause of trouble. Most have cervical spine problems as the source of clinical suffering. Most of these patients get relief by treatment directed to cervical problems.

Excision of the cervical ribs is one of the commonly done, unindicated surgeries. The patients often have no relief from these procedures. When done in properly selected cases it should give good results.

An Approach to Diagnosis

EXAMINATION OF THE CERVICAL SPINE

It is fairly easy to examine the cervical spine and come to the possible diagnosis. Like any other clinical examination, sincere and regular practice of examination only will give competence in diagnosis.

Inspection: Note any asymmetry in the supraclavicular fossae which will require separate investigation (e.g. Pancoast tumour). Note the presence of torticollis which often results from protective spasm associated with trauma, tonsillar infection or vertebral body disease. In advanced infections and tumours the head may have to be supported by the hands. Note the thickening of sterno-mastoid.

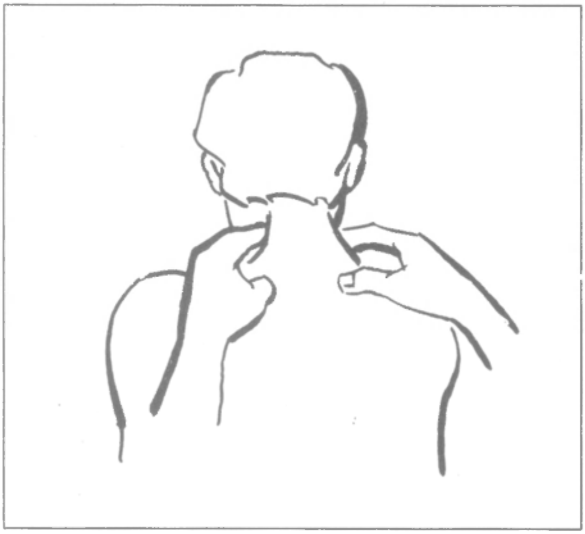


Fig. 22 Palpation Cervical Region

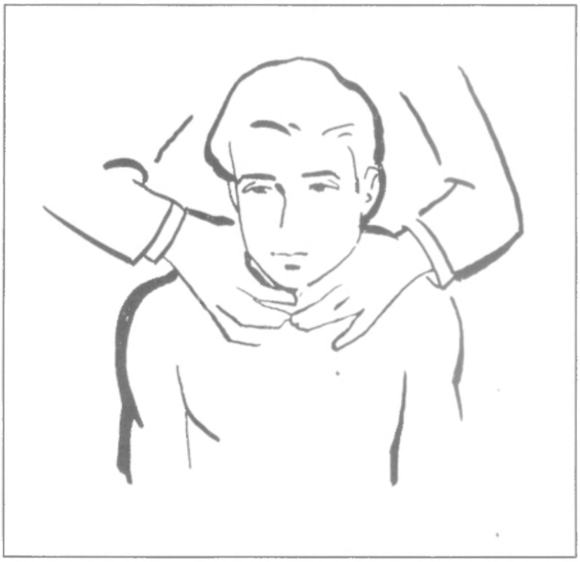


Fig. 23 Palpation Cervical Region

Palpation: Begin by looking for tenderness in the midline from the occiput downwards. Tenderness localised in one spot is common in cervical spondylosis and in infections of the cervical spine. Now palpate the lateral aspects of the vertebrae looking for masses and tenderness. Note that the most prominent spinous process is that of T1, and not the vertebra prominens, C7. Continue palpation into the supraclavicular fossae, looking particularly for the prominence of a cervical rib with local tenderness; look also for tumour masses. Complete palpation of the neck by examining the anterior structures including the thyroid gland.

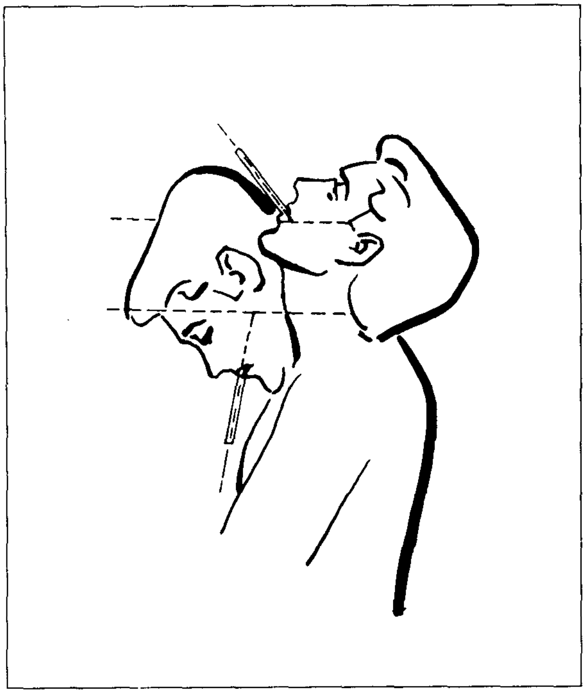


Fig. 24 Testing Flexion/Extension

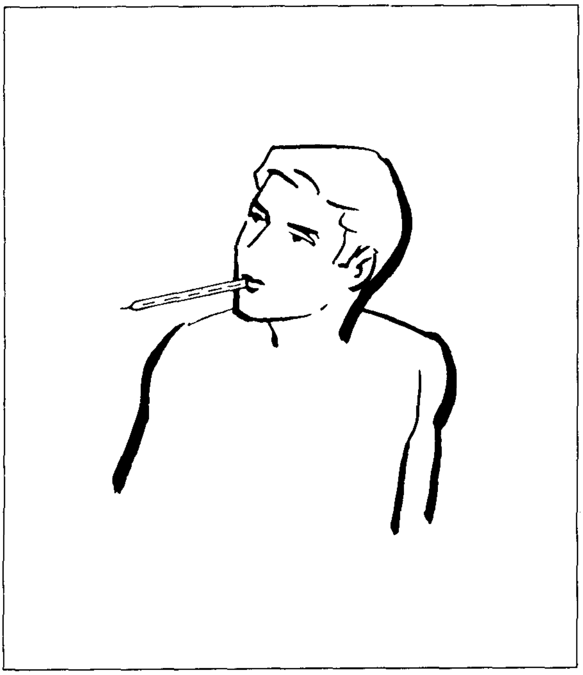


Fig. 25 Testing Rotation

Movements: Recording motion in the cervical spine with any accuracy is difficult, but may be attempted by using a goniometer. The patient should hold a spatula or a pencil or foot-rule clenched in his teeth, and this may be used as a pointer and magnifier of the movements.

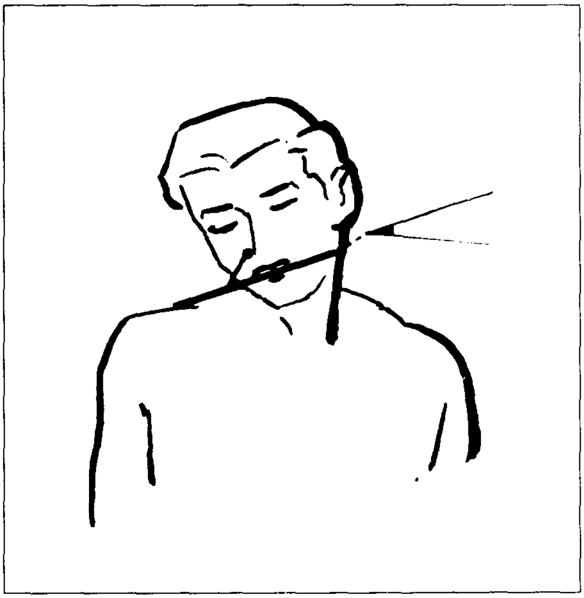


Fig. 26 Testing Lateral Tilting

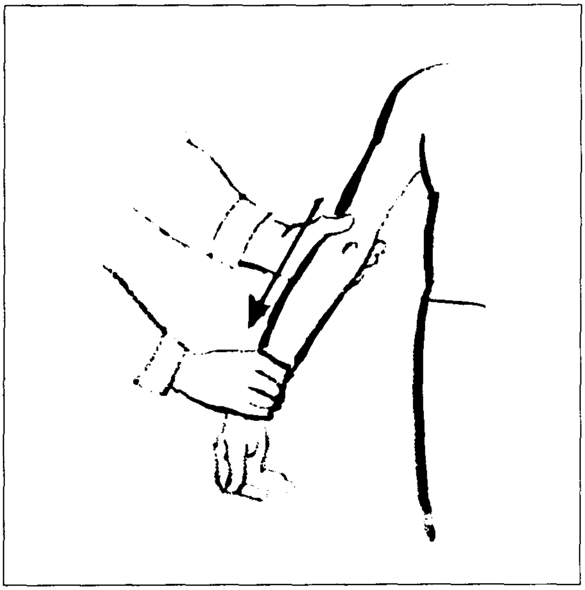


Fig. 27 Testing for Obliteration of Radial Pulse by Cervical Rib

Flexion: Ask the patient to bend the head forward. Normally the chin can be brought down to touch the region of the sterno-clavicular joints. The chin-chest distance may be measured for record purposes.

Extension: Ask the patient to tilt the head backwards. The patient should be seated erect. The plane of nose and forehead should normally be nearly horizontal but guard against contributory thoracic and lumbar spine movements.

Now ask the patient to flex and then extend the head. The range between flexion and extension can then be measured. Normal range = 130 Deg. Of the total range of flexion and extension, about a fifth occurs in the atlanto-axial and atlanto-occipital joints.

Lateral Flexion: Ask the patient to tilt his head onto his right shoulder. Lateral flexion with slight shoulder shrugging will allow the ear to touch the shoulder. Repeat on the other side and note any difference. Normal range =45 Deg. About a fifth of this movement occurs at the atlanto-axial and atlanto-occipital joints. Loss is common in cervical spondylosis. If lateral flexion cannot be carried out without forward flexion, this is indicative of involvement of the atlanto-axial and atlanto-occipital joints.

Rotation: Ask the patient to look over the shoulder. The movement may be encouraged with one hand, and the movement of the shoulder restrained with the other. Normally the chin just falls short of the plane of the shoulders. Normal Range = 80 Deg to either side. About a third of this occurs in the first two cervical joints. Rotation is usually restricted and painful in cervical spondylosis.

Crepitations: Spread the hands on each side of the neck and ask the patient to flex and extend the spine. Facet joint crepitations are normally detectable in this fashion in cervical spondylosis.

Cervical Rib: Look for evidence of ischaemia in one hand (e.g. coldness, discolouration, trophic changes). Palpate the radial pulse and apply traction to the arm. Obliteration of the pulse is not diagnostic, but when

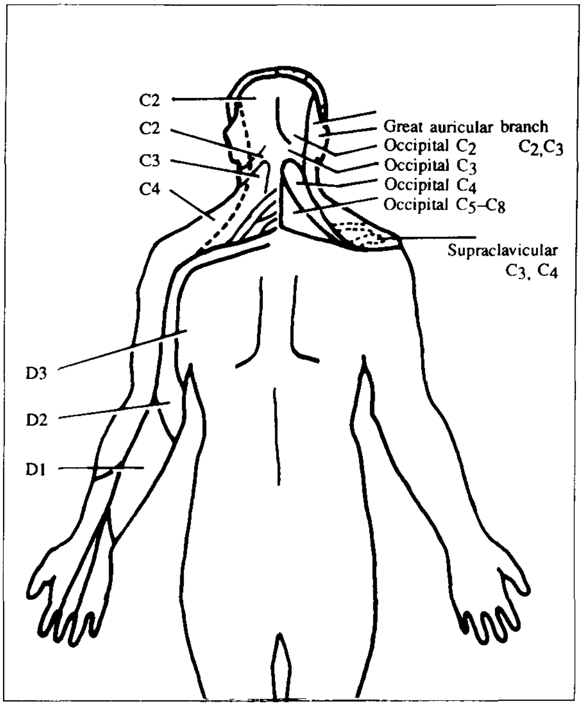


Fig. 28 Cervico-Dorsal Dermatomes From Front

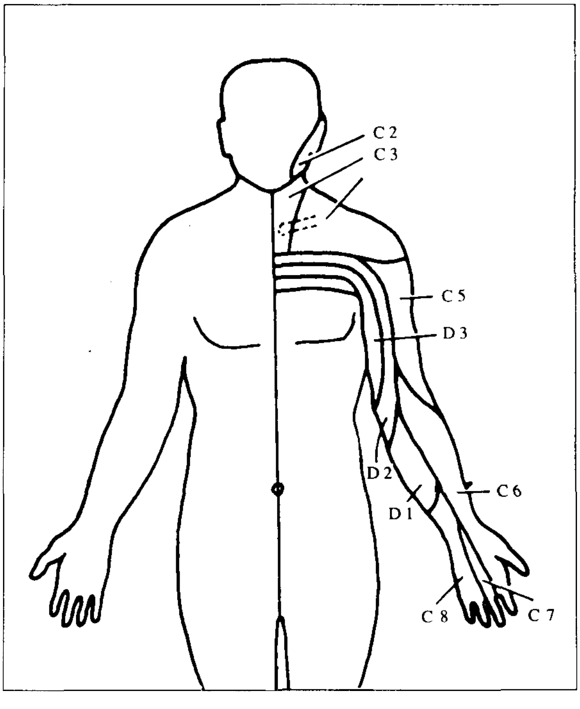


Fig. 29 Cervico-Dorsal Dermatomes From Behind

the test reveals no change when repeated on the other side it is suggestive. Ask the patient to turn his head to the affected side and take a deep breath (and hold it). If the radial pulse is obliterated (from scalenus anterior obstruction) this is suggestive of the syndrome. Auscultate over the subclavian artery. A murmur is suggestive of a mechanical obstruction, but repeat on the other side.

Neurological Examination: Examination of the segmental distribution in the upper limbs is essential. In addition, the plantar responses as a minimum should be checked for evidence of long tract involvement.

The accompanying table shows the segmental supply and the examination findings.

SPINAL CORD SEGMENT	DERMATOME	REPRESENTATIVE MUSCLE(S)	JOINT ACTION	REFLEX
C1	—	a.p.r.(C1-2) Rect. cap. ant. Longus capitus	Tuck chin in	
C2 + V cranial	Vertex Occiput Forehead Temple	p.p.r.(C1-2) Rect. cap. post. Maj. & min. obliques V cranial Mastication	Push chin up Jaw movement	— V cranial jaw jerk corneal reflex
C3 + V cranial	Neck Jaw Throat Inner clavicle	a.p.r. C3-4 Scalenes p.p.r. C3-4 Upper extensions of creator spinae	Press head and jaw laterally	V cranial jaw jerk
C4	Clavicle Supraspinous fossa Proximal deltoid	a.p.r. C4 Levator scap Trapezius	Elevate shoulder girdle	—
C5	Upper trapezius Deltoid and lateral arm to wrist	Deltoid	Abduction of arm	Biceps jerk

SPINAL CORD SEGMENT	DERMATOME	REPRESENTATIVE MUSCLE(S)	JOINT ACTION	REFLEX
C6	Upper trapezius lateral arm and forearm to lateral two digits	Biceps	Elbow flexion	Biceps, brachio radials extensor carpi radialis jerks
C7	Midscapular Post. arm to middle three digits	Triceps	Elbow extension	Triceps jerk
C8	Scapula Inner arm to medial two digits	Extensor pollicis longus Flexor digitorum profundos	Thumb extension Finger flexion	Flexor digitorum profundus jerk
T1	Lower scapula Inner arm to medial wrist	Intrinsic hand muscles	Finger adduction and abduction	—
T2	Inverted 'T' with limbs to inner arm pectoral and scapular areas	—	—	—

INVESTIGATIONS FOR THE NECK PAIN AND RELATED PROBLEMS

Radiology of Cervical Spine : In normal stance of looking straight ahead the cervical spine displays a gentle anterior convexity or lordosis. The posterior margins of the vertebral bodies are well aligned along this gentle curve.

In acute disk herniations less than 20% material is usually displaced from between the vertebral bodies. The annular layers are often undegenerated and tough, hence in most acute cases, especially in young persons, there is no reduction in the disk height. The presence of normal disk height does not rule out disk herniation in these people. The change of the lordotic cervical spine into a straight spine caused by the presence of muscle spasm could be the only useful radiological finding in diagnosing disk herniation.

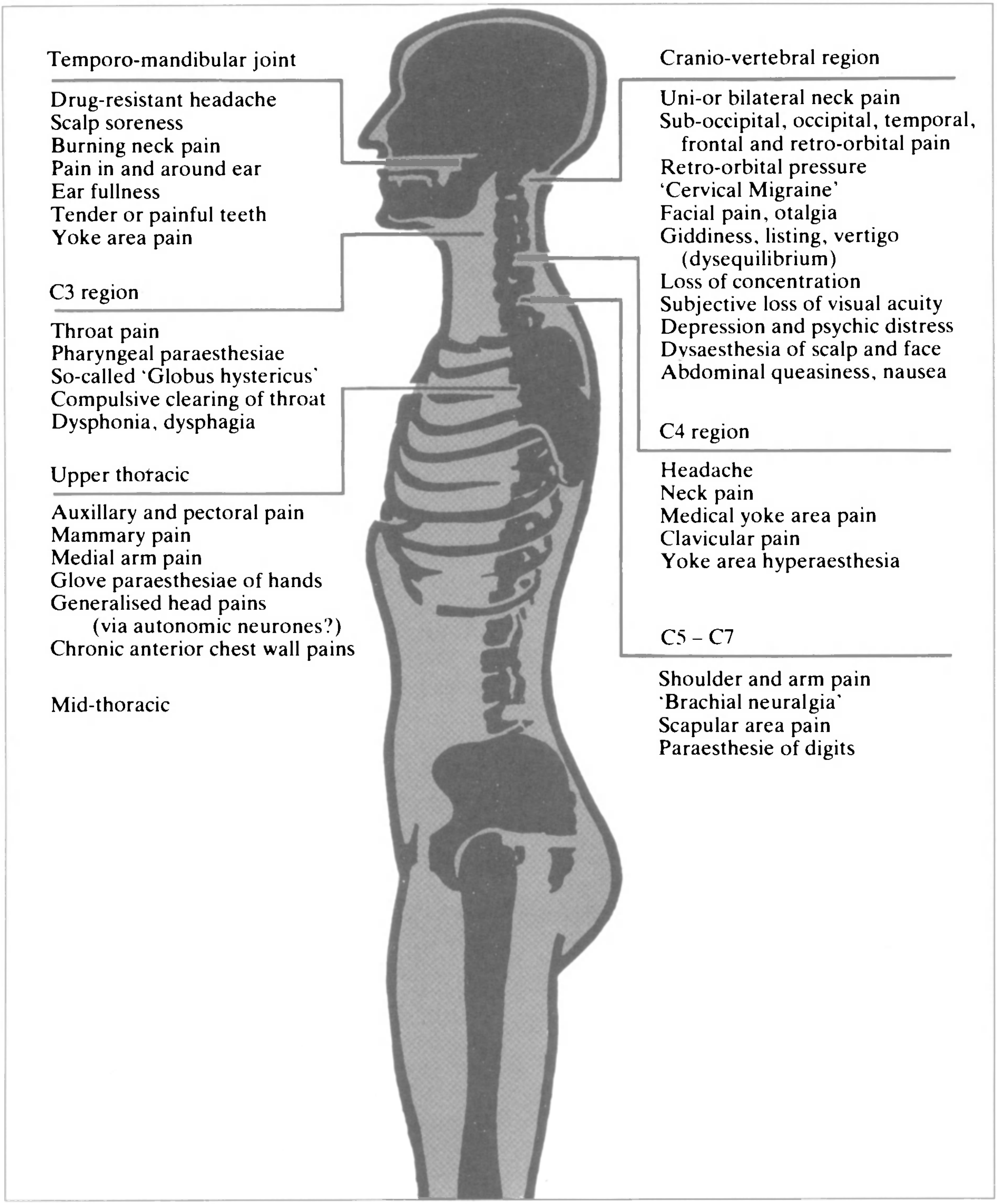


Fig. 30 Various Common Symptoms Associated with Cervical Segments

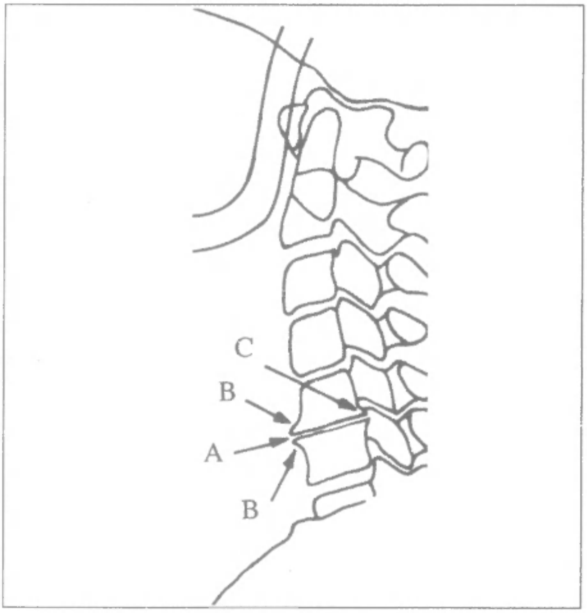


Fig. 31 Radiology of Degenerative Changes
A. Reduced Disk Height
B. Anterior Osteophytes
C. Posterior Osteophytes

The presence of normal disk height does not rule out disk herniation

With chronic disk degeneration the vertical height of the disk is reduced and radiologically the adjacent vertebrae are found to come nearer to each other as compared with the other normal disks and their adjacent vertebrae. It must be remembered that reduction in the disk height does not mean disk herniation, as is believed and reported by some radiologists.

The reduction in the disk height does not mean disk herniation, as is believed and reported by some radiologists

Generally with reduction in the disk height there is local loss of lordosis, sometimes even showing local reversal of the curvature into slight flexion.

The osteophytes are an attempt on the part of the body to broaden the base area of the vertebral body to achieve local stability and to reduce painful mobility. The anterior osteophytes are seen most commonly and by themselves are rarely the cause of any trouble. Even large osteophytes have not been proved to be a primary cause of pharyngeal irritation, that is complained by some patients.

There are normally no posterior bone encroachments into the spinal canal from the front. In degenerated cervical segments, often the posterior osteophytes arise from the adjacent margins of the vertebral bodies and encroach into the spinal canal. This may reduce the antero-posterior diameter, but may not necessarily compress the neural structures.

The facetal joints may show reduction in the joint space, sclerosis and irregularity of the articular margins. They are visible more satisfactorily in oblique views.

The lateral views are often done in extremes of flexion and extension. There is some physiological, angular as well as antero-posterior translational hypermobility at some segments in youngsters. Hypermobility beyond these limits especially at degenerated segments is significant when associated with reproduction of pain during positioning for X rays. In the presence of acute muscle spasm, the existing hypermobility may not reveal itself. If doubt remains, intensifier screening of movement may help.

One should compare the vertebral bodies with one another and note A) congenital vertebral fusion, and B) vertebral collapse from tuberculosis, tumour or fracture.

One should also note the relationship of each vertebra to the one above and below. It is helpful to trace the posterior margins of the bodies. Displacement occurs in dislocations, and may be small when the facet joints on only one side are involved.

The pharyngeal shadow lies fairly close to the bodies of the vertebrae. The displacement suggests a retro-pharyngeal mass, tuberculosis with abscess. Other causes include haematoma and tumour.

In the A-P view, interpretation is difficult due to the complexity of the superimposed structures. The shape of the vertebral bodies should be observed to note any lateral wedging, e.g. from fracture, tumour or infection. Note presence of any cervical rib.

The antero-posterior projections show upturned lateral corners of the vertebral bodies articulating with each other forming the unco-vertebral joint. The reduction in this joint space, the local sclerosis and growing osteophytes from these corners indicate local arthrosis. Normally the spinous processes are well aligned above each other. A gentle multi-segmental curvature or rotation may be normal. Well localised accentuated rotation of the spinous processes may indicate rotational malalignment of these vertebrae.

The oblique projections taken approximately at about 30 and 40 degrees show the boundaries of intervertebral foramen and the neural groove in the lateral masses. The anterior part of the foramen is formed by the unco vertebral joint, and any irregularity and osteophytic growths may be seen as an encroachment from the front. The facet joints form the posterior boundary of the foramen and their similar degenerative pathologies would cause encroachment from behind. These appearances would have a significance, when the symptoms and signs of segmental root involvement correspond with the level. The osteophytic irritation to the vertebral artery in the same transverse location may be a significant reason to cause vertebro-basilar insufficiency and the giddiness.

The radiological features of spondylosis do not necessarily go with clinical symptoms and signs. The patients with advanced long standing changes may have never suffered at all or only in the recent past. Many patients till the age of 35 may suffer chronically or recurrently for long time but may show no radiological changes. These patients have histochemical and physical changes of degeneration in the soft tissues, that has not yet progressed to the stage of creating bony changes.

C.T. SCAN : M.R.I.

The picture on routine X-ray films is the sum total of shadows of tissues placed in multiple layers. The relationship of different tissues in all three planes needs to be studied sometimes. In C.T. Scan and M.R.I., the imaging source and the imaging screen, are moved around the body in 360 degrees shooting multiple images from different angles. These collected images are processed by a computer and a slice-like picture of part of the body is produced. These images yield much more information than routine X ray films. These images can be combined in various manner and two dimensional or three dimensional pictures of the skeleton can be produced.

The C.T. Scan uses conventional X ray beams of very low radiation. It gives a very superior imaging of the bones and certain soft tissues. They are indicated when study of the bones is primarily necessary.

The M.R.I. Scan uses magnetism and studies and scans water content of different tissues. The images produced thus are water content specific rather than tissue specific. The magnetic signal is known to decay over a period of time. This decay pattern of different tissues and different pathologies varies. A diagnosis of the tissue and the changes in it are made by using this phenomenon. M.R.I. is especially useful in studying the soft tissues around the vertebral column, like spinal cord, disk, muscles and nerve roots.

These investigations being very sensitive, may show many abnormalities in the images. There are many false positive and false negative findings reported. The clinicians must remember that, like X rays, these scans must be interpreted only in the light of clinical picture. It is not uncommon to see patients undergoing undue anxiety due to reported abnormality in the images, which may have nothing to do with their clinical condition.

These investigations being very sensitive, may show many abnormalities in the images. There are many false positive and false negative findings reported. The clinicians must remember that, like X rays, these scans must be interpreted only in the light of clinical picture

The Management Strategy

ACUTE NECK PAIN/PARAESTHESIA

A large number of patients suffering from neck pain can be managed by family physicians. Given an opportunity many symptoms and short duration signs have a tendency towards spontaneous recovery. For any given pathology, there is always a certain rate of recovery. In reality, there is no way to accelerate the healing or resolution, but there are thousands of ways in which one can interfere with the process. Many pharmaco-therapeutic agents that claim to accelerate healing are perhaps removing the local obstacles to healing and are not really accelerating it. Our job as clinicians is to remove as many obstacles to the resolution process as possible, and prevent patients from interfering with it, which they often do. For example, even with acute spasmodic neck pain which is worsened by sitting and neck movements, patients, for reasons legitimate or otherwise, are unwilling to take rest, and hence prolong their misery. Some may even harm themselves by manipulations or by performing certain undesirable Yogaasanas.

Given an opportunity many a symptoms and short duration signs have tendency towards spontaneous recovery

Every patient with acute neck pain, especially with radiation to other areas, must be considered as a potential candidate for worsening his case and must be protected. There are a large number of analgesic, anti-inflammatory and muscle relaxant drugs available. They must be used judiciously as and when required. Many patients finding that the pain is relieved with medication tend to depend heavily on them. A simple bed rest, i.e. gravity elimination and stoppage of movement, with properly adjusted pillows for a day or so may be good enough to bring about rapid relief, especially if instituted soon after the onset of symptoms. It must be remembered that the presence of spasm means that the body has found it necessary to immobilize the neck. One must read these body signals and act accordingly. Even during the rest, patients are advised and encouraged to do static muscle contractions, which do not move the neck but prevent muscle wasting.

Presence of acute spasm, acute paraesthesia and radiating pain that worsens on sitting and neck movements, are an absolute indication for rest. Local heat in any form is useful.

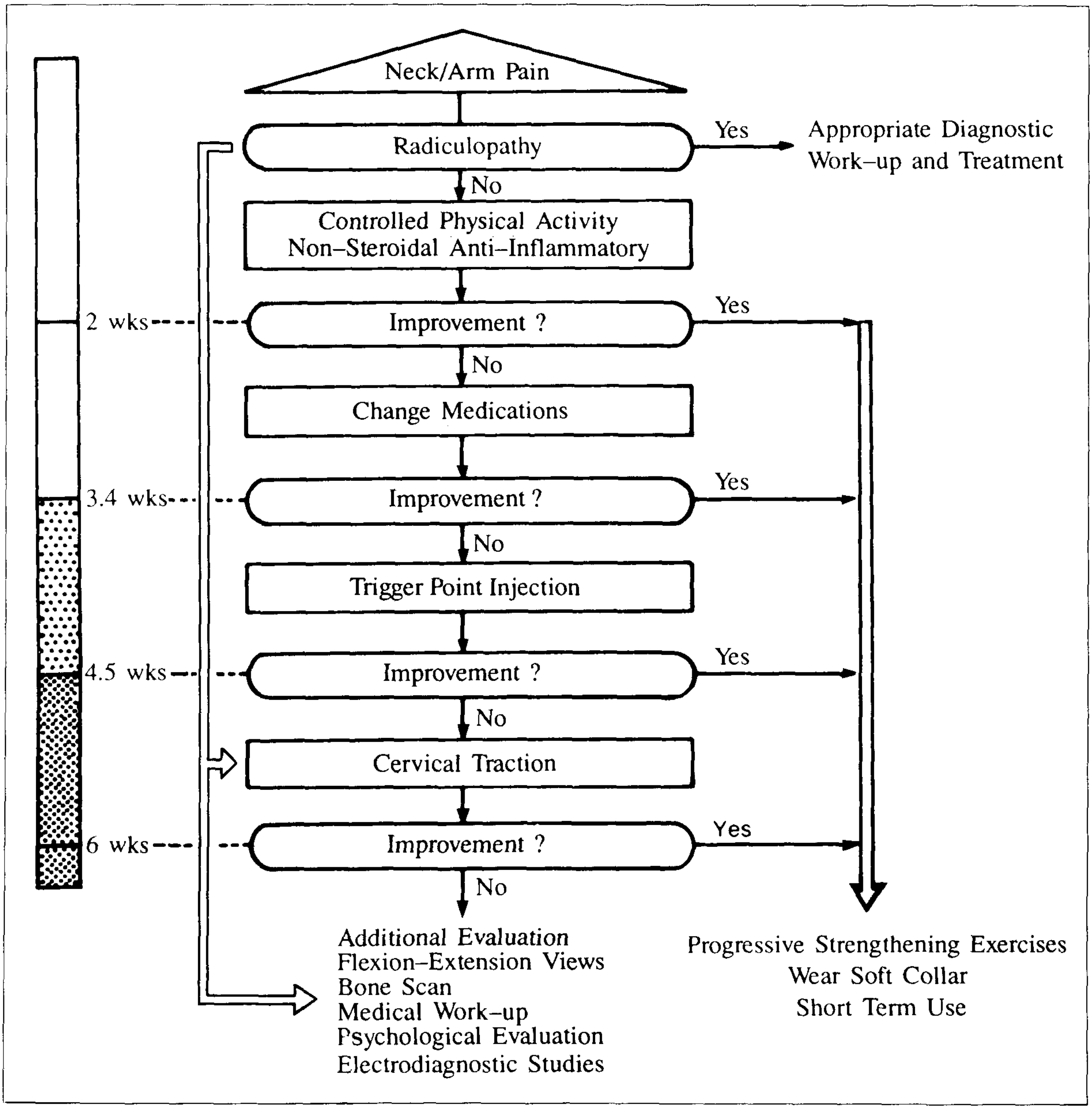
Presence of acute spasm, acute paraesthesia and radiating pain that worsens on sitting and neck movements, are an absolute indication for rest

Some degree of anxiety and tension always accompanies acute, function disrupting or non-abating pain. This calls for plenty of reassurance, sympathetic handling and sometimes anti-anxiety drugs.

After the acute pain and spasm is reduced, patients can resume their activities gradually. Most patients do not need support of a collar; only a handful may require it for only short periods.

This has to be followed by a programme directed towards restoring normal, painless function of the neck in a comprehensive direction. The ensuing stiffness of the joints and tightness of soft structures is improved by regular cervical traction, by manual stretching and mobilising exercises. The muscular strength and endurance (stamina), which are so important in neck function, are improved by graded exercises.

Persistence of acute symptoms beyond a week or worsening in spite of proper treatment, calls for further evaluation and investigations. It is preferable that the



Management of Chronic Neck & Arm Pain

patient be seen by some clinician well versed in the diagnosis and management of such cases.

Patients who show progressive relief can continue their treatment with the family physician. Majority of the patients fall into this category.

CHRONIC/RECURRENT NECK PAINS

If pain persists beyond a month or recurs often, the treatment strategy has to be different. Patho-physiologically, the chronic patient is not the same as an acute fresh case.

Patho-physiologically, the chronic-pain patient is not the same as an acute fresh case

The pain production may be lower or may be easily precipitable. The pain perception i.e. interpretation of the nociceptive stimulus is always on the higher side. Many tissues like nerves and muscles are tender and hyperexcitable. The muscles and other soft tissues may be stiff and contracted. Movements and resultant stretching of tissues may produce spasm and reflex inhibition of activities. There may be disuse atrophy and thereby loss of strength and endurance of the regional muscles which are so important for the health and normal functioning of the neck.

Pure analgesics and anti-inflammatory drugs have small and temporary role. Other modalities of treatment take importance. Apart from improving status of local structures, correct habits of using the neck and the spine, in general, have to be learnt. This calls for evaluation of work habits, work postures, environment, resting postures, and any pain inducing and pain influencing psychosomatic factors. A family physician, who closely knows the patient and his environs, is in a better position to understand this and suggest necessary corrections and remedies. However, help taken from physiotherapists, occupational therapists, who are trained in the rehabilitation of such patients, goes a long way. Only giving infra-red rays to the patient under routine dispensary set-up cannot be considered as proper scientific care.

Some patients may need help from a psychiatrist or a clinical psychologist or a medicosocial worker. Most patients are reluctant to see a psychiatrist. They must be told that this is routinely necessary for treating such pains. A patient can have hyperacidity, hypertension, acute cardiac problem and other psychosomatic illnesses, where the clinical condition is not fake but genuine, though the cause is in the mind. Same is the case with many chronic pains like headache, neck and back pain or abdominal pain. The clinician must never doubt genuineness of the patient's suffering and tell him off saying, " it's all in your head ". He needs to be assured that he is not being singled out for getting labelled as psychiatric case and this referral does not mean he is being transferred to psychiatric care. We are only taking help from a psychiatrist, like we would, from any other specialist like a neurologist or an E.N.T.

The clinician must never doubt genuineness of the patient's suffering and tell him off saying, " it's all in your head "

Many patients need anti-depressant drugs. Their effects take few days to appear and they need to be continued for many weeks or even months in some cases. There are varieties of these drugs and they may have to be used in various combinations to avoid side effects like drowsiness, dryness of mouth, constipation etc. They can be continued for many months if needed and most have no cognizable side effects or habit formation. Any dependence on these drugs often develops due to persistence of the underlying psychopathology, rather than addiction. In a chronic pain patient, it is worthwhile, to give only anti-depressants or in combination with anti-anxiety drugs in the beginning. The relief reported at the follow-up visit after a week or so, will tell us the extent to which psychological factors have contributed to the pain. Analgesic—anti-inflammatory drugs can now be added as per requirement.

Some Common Treatment Modalities

DRUG THERAPY

Analgesic — anti-inflammatory drugs should be used judiciously. NSAIDs like Ibuprofen give pain relief and help restore mobility. A large number of NSAIDs have been discovered in the last decade but they do not seem to offer significant advantage over the earlier ones. Instead of trying every new NSAID coming into the market, it is better to familiarise oneself with a few which have been shown to be safe over several years. Long-term usage of such drugs can sometimes cause G.I. irritation and other side-effects. Therefore, alternative measures as enumerated below should be tried. Some clinicians also prefer to use muscle relaxants. However, relief from pain itself helps to relieve muscle spasm.

SHORT WAVE DIATHERMY

Heating of tissues is an age-old remedy for pain and inflammation.

Any heat applied to the body surface is difficult to reach the deeper tissues. The vascular network in all the underlying tissues behaves like the car radiator — the continuously flowing blood takes away the incoming heat to other parts of the body. This happens irrespective of the source of heat. Even the Infra-Red rays so popularly used do not really penetrate deeper than 3 to 4 mm in the body. The heating of the deeper tissues takes place after a long time; a heated layer of tissues transfers its heat to the next layer slowly.

Short Wave Diathermy is a method of treatment in which short length radio waves are passed through the tissues from one rubber covered electrode (pad) to another by electromagnetic induction. The tissues offer great resistance to the radio waves that pass through them, thereby converting electrical energy into heat in the cells at depths of the tissues.

Therapeutic effects of Diathermy are brought about by dilation of the arterioles and capillaries resulting in increased local blood flow and improved oxygenation. There is increase in the supply of nutritive materials, antibodies and white blood cells. The dilation of capillaries increases the exudation of fluid into the tissues followed by increased absorption. This process along with increased blood flow through the area, assists in removal of waste products and helps bring about resolution of inflammation.

Diathermy is the cheapest and easily available form of deep heat. It can be used for deeply placed structures to reduce pain, inflammation, or in musculo-skeletal disorders like degeneration, osteoarthritis, chronic R.A. etc. It is a very useful preliminary before active and passive exercises. It improves benefits of exercises and stretching of the tight tissues. It is also useful in reducing muscle spasm, muscle sprains, strains, neuritis and traumatic conditions.

Initially, the therapy is given daily for 15-20 minutes, and then gradually tapered off. Contrary to the prevalent belief and trend, there is no fixed number of sessions to be given. It is strictly decided as per requirement. It is contra-indicated in pregnancy, tumours and infectious diseases.

ULTRASOUND WAVES

Ultrasound waves, i.e. the sound waves above the human audible range, are used in medicine for various purposes. Ultrasonography, the excellent diagnostic tool, is one of the common examples. Same waves at different frequency can be used for therapeutic purpose. A high frequency current is converted into high frequency sound waves and applied to the body surface. These applying transducers are gently moved over the skin surface transmitting the sound waves into the body. When these ultrasound waves penetrate the body they are converted into heat energy when they strike the cell membrane.

The penetration to the depths depends on the intensity. Generally superficial tissue problems are treated with good success.

These sound waves seem to work in the following manner :

1. **Mechanical effects:** A micro-massage occurs at the cellular level, when the cells are alternately compressed and then pulled apart, affecting the intercellular fluid area thus reducing oedema, as in acute synovitis of the facet joint or soft tissue damage.
2. **Thermal effects:** During absorption in the body, the ultrasound waves are converted into thermal energy (heat).
3. **Biological effects :** Insonation (to bring about vibration with sound waves) of a damaged tissue produces change in the rate of protein synthesis, and thus has a role in tissue repair. The mechanism of pain relief is like TENS, acupuncture etc. due to gate control phenomena.

In the new soft tissue injuries and inflammation, it helps remove traumatic exudate and reduces the danger of adhesion formation. This allows early mobilisation of the injured part. Scar tissue is made more pliable which allows more effective stretching and release of underlying contracted and adherent structures. Also it is useful in relieving spasm and decreasing the inflammatory response over well defined lesions such as a facet joint capsulitis in the spine.

It reduces the chronic oedema and helps break down adhesions between adjacent structures like in periarthritis or postoperatively.

Ultrasound waves are not transmitted through air, hence some couplant/lubricant that transmits these waves must be interposed between the treatment head and the patient. Various fluids like liquid paraffin, gels, distilled water and even ointment with methyl salicylate and iodine can be used.

The treatment is given daily initially and is followed by tapered sittings depending on the recovery and desired changes.

This therapy should be avoided in growing ends of children's bones in acute sepsis, malignant tumours, pregnancy and in areas of cervical ganglion and vagus nerve due to the risk of autonomic stimulation.

INFRA-RED LASER

(Light Amplification by Stimulated Emission of Radiation)

It is a non-invasive treatment modality. The therapeutic effects are produced by using a concentrated beam of light generated by a laser probe. Due to its photochemical reaction in the body, the photons are absorbed and help in reducing pain, inflammation and oedema. The laser beams achieve this by vasodilatation of arteries and capillaries, normalisation of hydrostatic pressure in the capillaries, influencing cell protoplasm balance, and improving cell metabolism.

The therapy is directed towards pain points, trigger points and acupuncture points. Using different types of probes, single or multiple points are activated within the area of pain. Pulsed laser therapy is usually applied to very acute conditions whereas continuous laser therapy is used in semi-acute and chronic conditions. Laser is also used in fresh traumatic pathologies like nerve injuries, contusions, ligament and tendon injuries, and for chronic ulcers, as it is known to accelerate tissue healing. It is also used in referred pains, neuralgias and for muscle relaxation and is of great value in chronic conditions like facetal osteoarthritis, capsulitis and rheumatoid arthritis.

Since the local delivery of energy is of a very high order, the therapy is usually given on alternate days for a duration of 30 seconds at each spot and for a total time of five minutes and tapered according to the recovery. There are no long term ill-effects reported from laser therapy. Initial increase in local discomfort or tissue irritation is noted by some patients.

GATE CONTROL THEORY: TENS, ACUPUNCTURE, ACUPRESSURE

Normally the pain stimulus is carried by small size fibres to the cord and then to the brain. A strong electrical or physical stimulus given to body parts are carried by large size fibres. These large fibres when stimulated compete with the small pain carrying fibres thus blocking their conduction. This selective priority transmission of impulses stops reaching pain messages to the brain and is called as Gate Control Theory. The modalities like Acupuncture, Acupressure, TENS work on these principles.

TENS is a method of producing non-specific analgesia by non-invasive form of high frequency electrical stimulation. The treatment is carried out with the help of two surface electrodes. The machine is a portable unit providing current for sensory stimulation to block pain.

There is also some evidence that this method results in release of endorphins (the naturally occurring analgesics of the body) in the central nervous system. The modality does not alter the pain production but may alter or abate the cortically mediated secondary body changes like muscle spasm, release of adrenergic chemicals etc. This effect usually lasts for about 2-3 hours.

It is generally used as an adjunctive measure to other active forms of therapy. It can be of value in large number of acute and chronic conditions like muscular spasm, neuralgias, bursitis, tension headaches, radiculopathy, rheumatic pains, post-operative pains, etc.

CERVICAL TRACTION

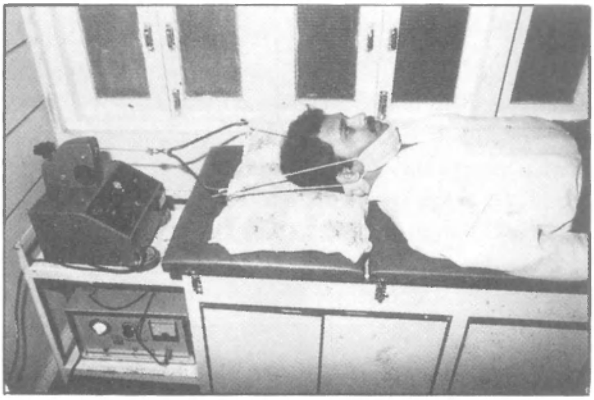


Fig. 32 Cervical Traction : Lying Down

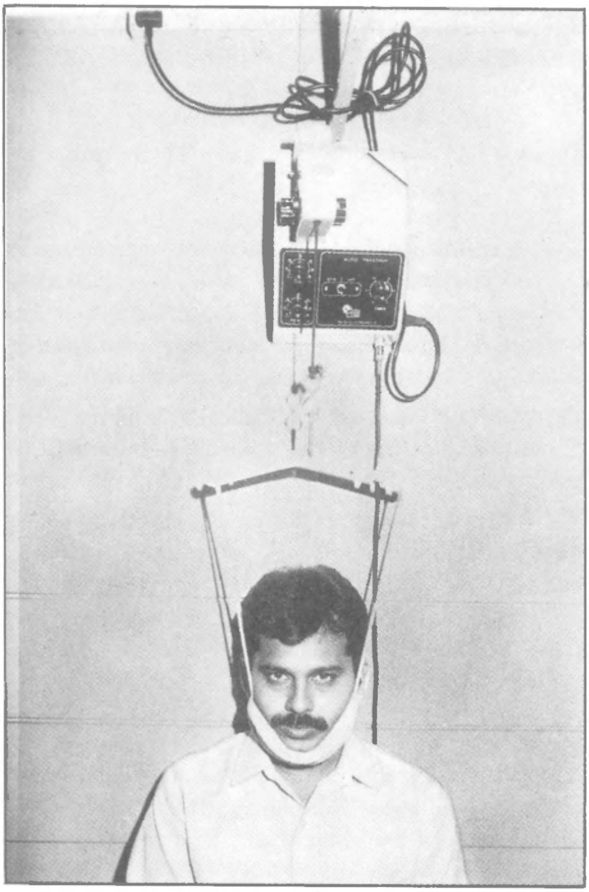


Fig. 33 Cervical Traction : Sitting

Many patients suffering from neck pain have stiffness and tightness of soft tissue structures, either as part of primary pathology or as a result of it. These patients need stretching of soft tissues for primary relief or for improving flexibility. In some cases actual or relative narrowing and crowding at the intervertebral foramina causes root symptoms and signs. These cases need axial stretching which reduces cervical lordosis into straight spine which increases capacity of the central canal and the intervertebral foramina.

Many patients suffering from neck pain have stiffness and tightness of soft tissue structures, either as a part of primary pathology or as a result of it.

The roof of the intervertebral foramen is formed by the pedicle of upper vertebra while the bottom is formed by the pedicle of the lower vertebra. The traction, by allowing some amount of separation of the adjacent vertebrae, brings about stretching of the annulus and improvement in the vertical height of these foramina. The bulge of a herniating disk may become less prominent as the compressive pressure on the nucleus pulposus, that is pushing it out as the disk-bulge, is reduced.

In cases of acute radiculitis, apart from relieving the mechanical compression and irritation, this also improves the circulatory and lymphatic disturbances of the roots and relieve their oedema.

In the routine clinical practice, the stretching is sometimes done manually by a clinician. The commonest mode of applying the axial traction is to lift the head by a fabric strap underneath the chin and the suboccipital region upwards, either by a pulley and weight arrangement using gravity or by a mechanised machine. The weight of the trunk and the lower part acts as a counterforce. Traditionally, only 3-5 Kgs. pull is used, which is hardly sufficient to lift up the globe of the head and to bring about even simple straightening of the cervical curvature. The ideal pull to achieve worthwhile local change is 8-14 Kgs. for over 10-15 minutes. The soft tissues under the chin are delicate as also are the structures inside the temporo-mandibular joint across which the compressive forces are exerted. In many patients these tissues grumble and may become painful. This can be taken care of using electronically controlled mechanised traction devices, which lift and release alternately. When sustained pull is a necessity, as in cases of chronic contractures, the same traction process is carried out effectively in horizontal direction on the bed. Here the gravity related load of the head is supported by the bed and a much lesser pull that does not hurt sub-mandibular and temporo-mandibular structures is sufficient to bring about the desired result.

The local physical changes brought about by traction soon disappear but the clinical improvements are seen sooner or later. There is no fixed course of a particular number of traction sessions. Somebody may need only three to four, while others may need it for many weeks. Some patients report worsening of their complaints after traction and give it up too soon, or are reluctant to have it again even when they need it. In most cases this increased discomfort soon changes into relief from pain and neural symptoms. A slight change in the angle of pull, the degree and duration of the pull, and reassuring the patient is all that is needed. Some patients acquire traction sets and use them regularly in the house, either by themselves or on the advice of doctors. Weak outstretched structures can themselves be a source of pain and instability. Therefore this is to be discouraged and allowed only after properly training and briefing the patient about the pros and cons of the use.

A quick sharp pull on any muscle brings about sudden contraction of the muscle like seen during testing tendon reflexes. (This is called Myotatic reflex.) On the other hand, a sustained firm pull on any muscle causes Reverse Myotatic Reflex and in fact brings about inhibition of the contraction, i.e. relaxation, in case the muscle is in spasm. Thus, in acute painful conditions, the pain producing muscle spasm can be relieved by prolonged continuous traction.

Except major infections or neoplastic diseases, there are almost no contra-indications for gentle traction when judiciously given and properly monitored. Ideally, the patient must be evaluated and the traction modality prescribed only by a clinician well versed in the management of neck and back problems.

CERVICAL COLLAR OR BRACES

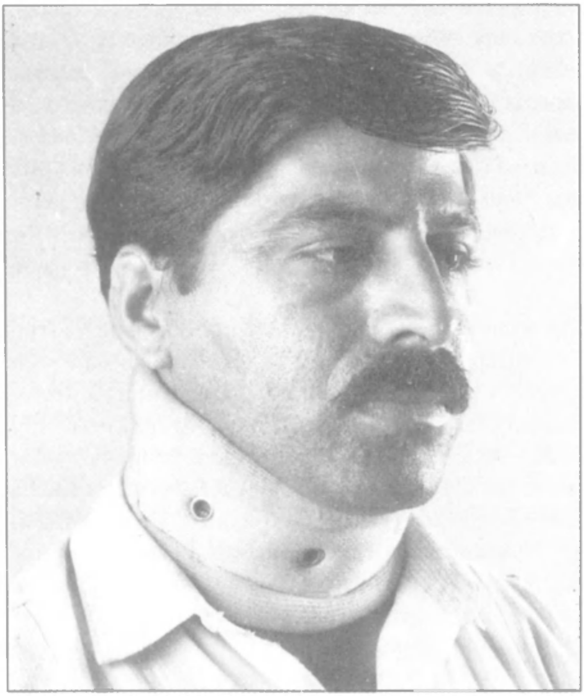


Fig. 34 Cervical Collar

It is not uncommon to find many clinicians advising their patients to use cervical collar as soon as a radiologist's report mentions cervical spondylosis. It is even more common for many patients to buy or borrow cervical collar and use it without proper medical advice

Many use it for years together and develop psychological dependence on it. For many it is an attempt to give authentication to their physical or psychologically induced chronic neck pains. Some use it as an excuse to ward off work and responsibilities.

The basic purpose of any spinal brace is to allow routine activities, while giving local rest to any part that needs rest or to restrict the range of motion when so needed. Except in acute painful conditions, where the presence of muscle spasm indicates need for local rest, or when there is a major pathology causing instability or has potential for neural damage, the cervical collar need not be and should not be used. Majority of the routine neck pain patients do not need it, barring those who have major pathologies like neoplasms, major destructive infections or major post-traumatic instabilities. Even then a collar is needed and those needing it need it for such a short period that buying such a collar may be worthless. These patients rarely need collar for more than a week or two and can manage on some simple temporary collar made out of any stiff material like paper fold, cardboard or even discarded x-ray films. Generally softer and shorter the collar, less effective it is.

Even judicious stoppage of neck movements by the collar causes muscular wasting, loss of strength and endurance. It is mandatory that during the use of the collar, the neck muscles must be exercised. If for the underlying disease like infection, neck mobilisation is not allowed, gentle static isometric contractions must be carried out.

It is mandatory that during the use of the collar, the neck muscles must be exercised

BIOFEEDBACK MUSCLE CONTROL TRAINING

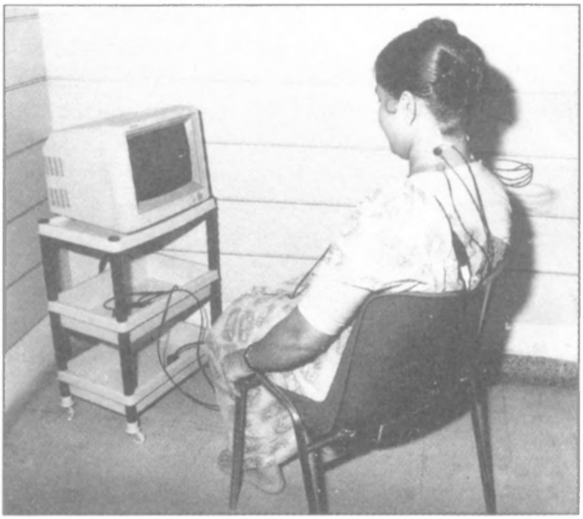


Fig. 35 Biofeedback Muscle Control Training

The electrical activity that we see in any functioning peripheral muscle can be picked up by surface electrodes and can be displayed on monitor like the cardiac monitor shows cardiac electrical activity. Normally larger the number of functioning motor units, higher the electrical voltage generated. A strong contraction will display high voltages while well relaxed muscle would display decreased voltages.

By giving visual or auditory information to the brain, it is possible to control the motor changes in the body. This modality of feeding back the information about the biological happenings in the body is called Biofeedback.

It is amazing but true, that not only volitional motor activities can be controlled and modified, but also the autonomically controlled biological parameters like heart-rate, blood pressure, cutaneous temperature can be altered by training, like that acquired by some yoga experts.

In large number of patients, neck pain occurs due to imbalance or inefficiency of muscular functions, precipitated by local overexertion and fatigue

In large number of patients, neck pain occurs due to imbalance or inefficiency of muscular functions, precipitated by local overexertion and fatigue. These imbalances can be detected, studied and analysed by using computer based E.M.G. machines. These functional patterns can be displayed and patient is trained to change them. Most patients learn correct, energy-economic postures and working habits by training on these machines.

What is not commonly appreciated by most clinicians is that undue use of motor units can cause pain as much as inefficient use. This is commonly seen in tension headaches, T.M. Joint syndromes, Coccygeal pains or any musculoskeletal region pain induced by anxiety and worry. In fact, persistent high muscle tension and inability to relax them is a common finding in anxiety states. This biofeedback modality is extremely useful in treating patients suffering from neck pain with high muscular tensions. Unfortunately, this valuable modality of treatment is available only at few places in India.

LOCAL CORTICO-STEROID INJECTIONS

The tender trigger points (which some people call 'Fibromyositis') are often treated by local cortico-steroid injections. The inflamed pericapsular tissues in periarthritis can also be treated by local injections. The steroid is usually mixed with local anaesthetic agent which helps in localizing the source of pain and assures that the steroid is instilled in the correct spot. Since hardly any histopathological changes have been demonstrated in these spots, it is not exactly known how these injections work. Some people have injected these spots with only normal saline and have found equally good results. Whether the locally instilled chemical works, or the acupuncture-like effect of the needle prick works, cannot be established.

Most steroids used are crystalloid suspensions which dissolve locally over many days. Certain preparations like methyl prednisolone linger for over three to four weeks and their injections need not be more frequent than once a month. There is a tendency of some clinicians to inject these spots as frequently as once a day or on alternate days. This has no scientific basis.

Some clinicians inject local steroids as frequently as once a day or on alternate days. This has no scientific basis.

These drugs can also be instilled in the inflamed facet of joints or around the exit of inflamed nerve roots. When accurate localization is important, they are, and should be given with the help of X ray image intensifier T.V. monitor.

These injections need good aseptic precautions and therefore must be given in the operating room set-ups rather than in casual examination room set-ups. There is no fixed course of a particular number of injections. The pattern of relief or even futility decides the number of injections. A slight increase in the discomfort is noted by some patients since the hypersensitive tissue mass is now logged up with extra fluid. This can be treated by hot fomentation, routine analgesics, etc.

The local steroid injections need good aseptic precautions and must not be given in the casual examination room set-ups

MASSAGE

Massage means alternate compression and release of the palpable soft tissues and periosteum from outside, either manually or by using various gadgets. This brings about expression of accumulated waste products, which cause local soreness and fatigue. During the act of releasing pressure, there is an influx of new oxygenated blood which reduces soreness, pain and improves function.

In order to prevent friction of the hands on the skin, some lubricant or various lubricant-based ointments and creams are used. Some of the chemical compounds used in the creams and ointments may penetrate the skin, but are absorbed into the blood or lymphatics and get washed away. They hardly ever reach the usually needed depths of the tissues. Many anti-inflammatory drugs like piroxicam, diclofenac, etc., are claimed to get absorbed through the skin. However, the available scientific evidence is not conclusive. The massage is generally contra-indicated in infections, tumours and in early stages of traumatic oedema.

MANIPULATION

Manipulation is one of the most common methods to treat neck pain. It is also the most controversial. Manipulation or osteopathy is the treatment in which vertebral segments are made to go through vigorous manually performed motions. It is based on the presumption that there is some sort of "displacement or subluxation" of one or the other spinal structure and an attempt is made to restore the normal alignment and structural relationship. These so called displacements or subluxations diagnosed by osteopaths can rarely be scientifically confirmed or proved. Therefore, the very diagnosis is totally subjective and would change from one osteopath to another.

In some countries there are osteopathy colleges which impart systematic and scientific knowledge of relevant aspects of anatomy, physiology, pathology, radiology and orthopaedics. The osteopaths who earn degrees from such colleges at least know what they are dealing with. These osteopaths need licence to carry out their profession. They are controlled by official governing bodies and have regular CME programs and conferences. Unfortunately, the osteopathy scenario in countries like India is very different. We have a large population of self-proclaimed and self-taught manipulation practitioners, who are not only scientifically untrained but most often are even illiterate.

There are various of ways to carry out manipulation. The vertebral segments are generally forced, to and beyond the available range of movement, with or without pull on the spinal structures. A differential movement between the components of a spinal motion segment can be satisfactorily carried out only when one component is stabilized and the other moved. This is not a practical feasibility, though. Generally large lengths of the spine are manipulated and unwanted vertebral segments have to unnecessarily undergo stressful pull and twist. It is nearly impossible to localize and direct the forces accurately to the presumed target segment.

The soft tissue structures in different patients have different tensile strength and they may be either permanently stretched and elongated or may get ruptured. The quicker and sharper the manipulating force, higher are the chances of rupture. The twisting motions are the most harmful, especially for annular fibres. It is not uncommon to see incomplete annulus ruptures, completely ruptured with extrusion of the nucleus pulposus, following manipulation.

Presence of severe spasm, neural compression and suspected instabilities are the main contra-indications for manipulation. It may be useful in mobilizing stiff soft tissues when properly carried out. Forceful manipulation should be avoided because such manipulations let out some crackling noises and patients get a satisfying feeling that something has been 'set right'. A gentle stretch and mobilisation, though less satisfying, could prove safe. There is no scientific data available to prove the superiority or usefulness of manipulation.

Surgeries for Neck Pain

We all appreciate that, in spite of critical evaluation, sometimes it is not possible to isolate the source of pain. In case multiple factors are known to cause pain, it is not possible to ascertain the different extents to which these factors are responsible. It is therefore difficult to incriminate any one factor and decide whether remedial surgery directed towards such a factor would help, common example being a cervical rib whose removal fails to relieve the patient's complaints.

We also have to take into account the fact that radiological abnormal findings do not necessarily indicate the source of pain. Also soft tissue abnormalities, especially of dynamic nature, like laxity and resultant instability, are not routinely detected. Newer sophisticated investigations are very sensitive and show many false positive findings. For example, MRI may show degeneration of disks at multiple levels but only one of them may be responsible for pain; the MRI giving no clue whatsoever as to which one is the culprit. A myelogram may show indentation in the dye column at some level while the symptomatic root may be at different level or on the other side.

The psychological factors play a major role in inducing and influencing neck pain. In many studies it has been found that any pain that lasts for more than six months is very difficult to be relieved. Many of us believe that chronic pain causes anxiety and depression. Therefore removal of pain source would revert the psychological changes of depression. This is not always true. Many patients who suffer from chronic depressions, in spite of being correctly indicated and meticulously performed surgery, continue to complain of neck pain. Generally patients with associated severe anxiety, depression, paranoid schizophrenia, hysterical tendencies do not show good results of surgery performed for pain.

Many patients who suffer from chronic depressions, in spite of being correctly indicated and meticulously performed surgery, continue to complain of neck pain

Sometimes patients suffering from neck pain receive inadequate and improper non-surgical treatment. The failure of such non-surgical treatment, therefore, is not an indication for surgery. These patients should receive a fair trial of properly directed and conscientiously and meticulously carried out conservative care. During this period many symptoms and signs crystallize or even get altered. This also gives the clinician an opportunity to know the patient better.

The chief indications for the neck pain surgery are:-

— Chronic intractable pain where the source has been localised with certainty as a particular disk.

— Chronic recurrent compressive radiculopathies.

— Overt degenerative or post-traumatic instabilities.

— Compressive or post stenotic myelopathies.

— Rarely, acute disk herniations with a major neurological involvement. (Majority of the acute disk herniations, even those with moderate grades of neurological involvement can be treated non-surgically.)

The surgery for neck pain is essentially of two types :

1. Decompression of the neural tissue.
2. Stabilisation of painful spinal segment.

Both can be carried out singly or in combination; simultaneously or at different sessions.

Fig. 36 shows the various procedures done.

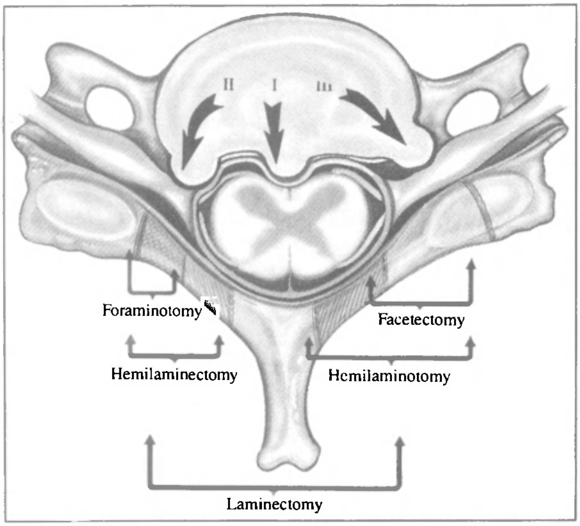


Fig. 36 Various Surgical Approaches

Hemilaminectomy = Removal of one sided lamina.

Total laminectomy = Removal of both sided laminae and the spinous process.

Fenestration = Making a window like opening between two adjacent laminae, sometimes trimming their margins and areas of the facet joint including its osteophytes if any, as per the requirement.

Laminoplasty = expansion of the canal by raising the laminar roof.

Diskectomy from behind.

Diskectomy from front.

Osteophyte removal from front.

Interbody grafting and fusion.

Various anterior and posterior instrumentations.

LAMINECTOMY

It is not the main surgical procedure. It is only an approach to the intra-spinal region for doing something else, similar to making a window in the wall to gain an access into the house. It turns out to be the main surgical procedure only in cases like Cervical Spinal Canal Stenosis.

DISKECTOMY

When there is postero-lateral small bulge causing root compression, it can be removed from behind by fenestration or laminectomy. The lesion being small, its removal is unlikely to leave behind or create a major biomechanical deficiency and instability in the segment. If the bulge is small, during its removal too much retraction of the root and the cord is generally not required. A large midline bulge cannot be removed from behind without danger to the cord. When such disk needs removal or the disk needs removal as a preliminary step to inter-body fusion, the surgery has to be done from front. This involves removal of a very large percentage of total disk material, which is likely to leave behind potentially hypermobile or unstable segment. Some surgeons, therefore, combine total diskectomy with interbody fusion.

SPINAL FUSION

The main indication of this procedure is to stop already existing or potentially expectant painful mobility of the spinal motion segment, which is causing or is likely to cause neurological problem.

This is generally done by denuding certain parts of the adjacent vertebrae and laying large quantities of cancellous bone on this bed. In few weeks these grafts fuse with each other and with the adjacent vertebrae to create a non-mobile motion segment. The autogenous bone graft is always superior to other types of grafts.

Such procedures done in lower cervical segments do not grossly restrict the overall mobility of the spine, since almost half of flexion extension and rotational movements still take place at cervico-occipital region. When surgical fusion involves these upper areas, movements are restricted to a major extent.

SPINAL INSTRUMENTATION

The instrumentations or implants used are made of special surgical steel or other alloys and generally do not cause tissue reaction. There are different types of implants designed to suit a specific location and purpose. They generally enhance the stability of the operated segments so that early ambulation can be started and the process of bone graft incorporation proceeds unhindered to successful fusion. The implants when properly used by an experienced spinal surgeon, rarely cause problems like mechanical tissue irritation, loosening etc. The spinal instrumentation needs support of fusion. When fusion is not done, the mechanical stresses on the implants can lead to breakage and loosening.

They can be removed after their purpose is over, i.e. when the segment is satisfactorily stabilized by the bone fusion. They may have to be removed earlier if complications arise or if they are infected.

The actual approach and the procedure selected depends upon the surgeon's choice and competence.

Certain procedures like routine laminectomy can be done by an occasional spine handling surgeon, while instrumentation and anterior major excisional surgery should be done by well experienced spinal surgeons. There is a widespread misconception amongst both medical and non-medical people, that orthopaedic surgeons cannot handle any neural tissue delicately. It is also wrongly believed by people that neurosurgeons cannot handle bone problems and cannot do instrumentation. In fact, the surgery can be competently performed by both orthopaedic and neurosurgeons who are appropriately trained for these procedures.

The surgery for neck pain can be competently performed by both orthopaedic and neurosurgeons who are appropriately trained for these procedures

In properly selected cases, relief from pain should be immediate, especially in acute, short duration pains. The neurological recovery takes time, and the paraesthesia and motor weakness linger for long. The final recovery of the neurological deficit depends upon how reversible or irreversible are the changes in the neural structures. A chronically compressed extensively fibrosed nerve root is less likely to lead to good functional recovery.

Contrary to the general belief, the post-operative neurological worsening is not common. The handling of pathological neural tissues with precariously compromised blood supply and venous drainage, may sometimes lead to it. It can happen even when surgery is most delicately and carefully done and does not necessarily indicate surgical error. Many patients however recover from neurological complications, while in a few cases remission occurs with some residual difficulties.

Surgery of the spine is one of the most unjustly maligned and disreputed surgeries. Many patients who deserve surgery do not undergo it with the fear of worsening. It is unfortunate that many of these patients are dissuaded from undergoing surgery by doctors. Many patients deteriorated their condition or showed poor recovery by not undergoing surgery when the conditions for success were optimum.

Many patients deteriorated their condition or showed poor recovery by not undergoing surgery when the conditions for success were optimum

Most patients postoperatively need some protection for the neck aided by collar or brace for some time. The postoperative activity schedule also varies with the procedure. But majority are allowed to move about in a short time. The neck needs static muscle strengthening exercises, while the rest of the body can be exercised as per requirement.

Prevention and Care of Neck Pain

The human cervical spine is subjected to enormous amounts of load and movements. It is no wonder then that neck pain is a common occurrence. It is also not surprising to have recurrence of neck pain.

These mechanical stresses are often avoidable. Adapting biomechanically correct posture can help achieve this. Proper, systematic use of the neck and related areas, forms an important part of this preventive care.

Proper, systematic use of the neck and related areas, forms an important part of the neck pain care

It is not always possible to keep the neck in biomechanically desirable position all the time. Any structure that is flexible and mobile is less likely to be affected by stretching stresses arising out of malpositioning. It is, therefore, necessary that the neck has as excellent flexibility as can be possible.

During any movement the primary stresses are borne by the muscles around the spine. When the peak point of the muscular strength is exceeded or when the muscles are fatigued due to poor endurance, the mechanical stresses are (suddenly or slowly) transferred over to the connecting tissues and the disks. These structures then can suddenly fail or develop fatigue related pain.

A patient of chronic neck pain who uses collar regularly, often has poor muscular strength and endurance. He usually has gross loss of flexibility. It is not unlikely that a simple act of lifting a bucket of water or sneezing can cause major mechanical failure like annulus tear and herniation of the disk. If such a patient keeps his neck in prolonged rotated postures like watching television positioned on his one side, he would develop fatigue related pains from muscles as well as connective tissues of the vertebral column.

FLEXIBILITY

Flexibility is usually excellent upto the 30s. As a part of degeneration process, it gradually starts declining in the 40s. The loss of flexibility can come earlier as a result of not using full range of motion either due to pain or fear of pain. The loss of flexibility in the early stages is, by and large, due to tightness of few soft tissues. It is possible to stretch them and regain fair amount of flexibility. After the 40s, many more soft tissues are contracted and there are changes in the bones like osteophyte formation and facetal arthrosis. This brings limitations on regaining flexibility. The range of mobility can be improved but perhaps not made normal.

It is important that every patient with neck pain concentrates on regaining or maintaining his flexibility before these irreversible changes in the bone tissues appear. Once these develop, he must have a realistic goal of stretching them. He must not cause damage by overdoing attempts like performing jerky motions, unscientific manipulations and certain Yogaasanas like Halaasan, Sheershaasan, Sarvangaasan etc. The patient must be especially cautious and careful of the crash courses which publicize and promise too much in too short a time.

It is important that every patient with neck pain concentrates on regaining or maintaining his flexibility

The Stretching Exercises are of different types:

Those that stretch

— the anterior structures (extension postures)

— the posterior structures (flexion postures)

— the lateral structures (lateral tilting postures)

— combinations (twisting and rotations)

These stretching exercises can be achieved in various manners.

— The patient can use opposite muscles actively. The patient himself or with the help of a therapist can do manual stretching.

— The various modalities like traction can be used.

The direction and extent of stretching is decided by the underlying pathology. For example, in the presence of herniated disk, the stretching has to be in slight flexion and lateral tilting. Though stretching in neutral or slight extension is not contra-indicated, in stenosis of intervertebral foramen and of the central canal extension it is definitely contra-indicated as it narrows these passages further.

The stretching is facilitated by local warming, hot fomentation, warm bath or deep heating modalities like Short Wave Diathermy. It should be started gradually, intermittently and continued for atleast 10 to 15 minutes per session twice a day. Though gentle swinging motions like in ballistic exercises can be allowed, jerky stretchings like in some forms of aerobic exercises and manipulation are undesirable.

Following early sessions of stretchings, local tissue oedema may cause heaviness, stiffness and soreness. Many patients who start exercises with over-enthusiasm are likely to overdo these stretchings and often are the candidates to give up the exercises due to stiffness and soreness. In such cases the exercises could be reduced but need not be stopped. This is especially important because if not regularly mobilized, these stiff oedematous tissues can undergo even more tightness (Rebound tightness). Local heat and drugs could help.

MUSCULAR FUNCTIONS

The efficient function of muscles of the neck has many facets.

Most activities require adequate muscular **Strength**. In order to carry out many of our functions these muscles need to work over prolonged periods even though not at their full strength. This ability of muscles to work for prolonged periods is, in fact, the **Endurance** or **Stamina**. Muscles also require **Ability to Relax** in a smooth, co-ordinated manner. Muscles, at times, also need **Agility** or ability of speedy action.

Regular and meticulous exercises form an important part of neck/back care. Most people need guidance of qualified and competent personnel in learning these exercises.

Regular and meticulous exercises form an important part of neck/back care

STRENGTHENING EXERCISES

They can be done in a graduated manner depending upon what stress the underlying structures can take.

— Simple, gentle static contractions or toning up exercises do not bring about movement of the spine and are useful in acute stages to prevent muscle wasting. They can be done as often as required.

— Gentle, unresisted isotonic mobilisation exercises can be done when acute pain and spasm subside and movements do not induce spasm.

— Resisted isometric exercises can be done only when the local problem has subsided and previous exercises have been done for a few days without any difficulty. They are the mainstay of developing **healthy protective muscular collar** around the neck.

During stretching, soreness and stiffness in early stages is expected but soon can be overcome. Regular exercises can improve almost all the facets of muscular function. In order that the effects of exercises are retained, they must be performed atleast four times a week. An occasional skip can be allowed without any disadvantage. Patients often discontinue them for smallest reasons like fever, menstruation etc. They can be reduced to few static gentle exercises but need not be stopped.

Most exercises do not show any appreciable benefits for the first few weeks. This period varies from person to person and can stretch upto a few months. Patients must be encouraged to go through this period by moral boosting and emphasizing the need to continue, lest they drop out.

YOGAASANAS

There is an unrealistic aura around Yogaasanas. People consider them as panacea for all problems from headaches to heart diseases and neck pains to nocturnal enuresis.

These are excellent stretching and partly strengthening exercises. Unfortunately, there is an unrealistic aura around Yogaasanas. People consider them as panacea for all problems from headaches to heart diseases and neck pains to nocturnal enuresis. They have no special advantages over other types of exercises. Using various parts of the body as load and by changing the body's orientation in relation to the gravitational forces, various groups of muscle in different sequences are recruited and unrecruited. Figures 37 and 38 show how similar flexion mobilisation or posterior stretching can be done in different ways. It can be appreciated that in the presence of neck pain, Jaanusheershaasan may be allowed but not Halaasan which puts considerable load and bending stresses on the painful neck structures. In the presence of neck pain, one would hardly consider it appropriate to carry even small weights on the head, but he may not think it wrong to perform Sheershaasan or Sarvangaasan and load the cervical spine by the whole trunk and lower limbs.

Yogaasanas help only if they are **thoughtfully selected, properly learnt and correctly performed.**

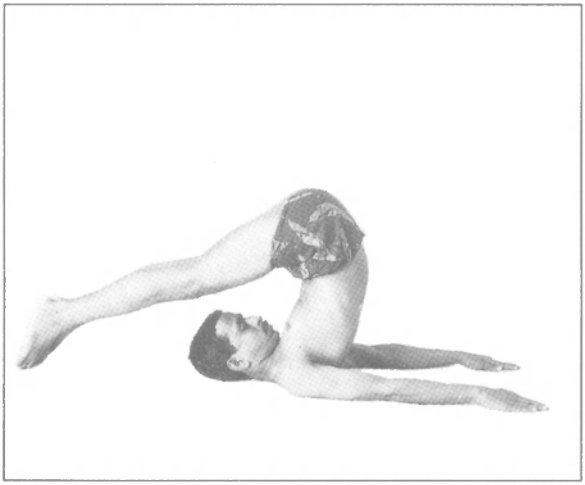


Fig. 37A. Identical yet Different Yogaasana Postures — Halaasana

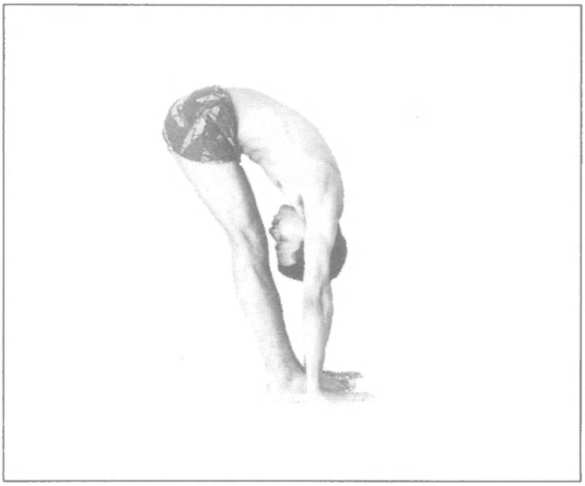


Fig. 37B. Identical yet Different Yogaasana Postures — Jaanusheershaasana

Short crash courses are only to be condemned, since they give the patients an undue sense of urgency and they are likely to harm themselves. Patients often try to imitate the postures shown in the books, charts or television performers and get into difficulty. They do not realise that these models have been practising yoga for years and only the best ones amongst them are selected as models. It is always necessary to take advice of a yoga teacher or prescriber who has medical knowledge about the anatomy and can spot problems, if they occur.

Though extension exercises mean backward arching, it is not the same as extensor muscle exercises. For example, during Naukaasan extensor muscles are continuously used while during Bhujangaasan the main stance is taken and maintained by the use of elbow extensors and muscles of the shoulder girdle. They are to be prescribed according to whether spinal lordosis is allowed or not. They may be allowed in disk herniation but not in cervical canal stenosis. In such a situation the extensor muscle can be exercised by using them from extreme flexion to neutral extension but not beyond.

Dos and Don'ts for Neck Pain Patients

SQUATTING AND SITTING ON THE FLOOR

The patient must keep his back as straight as possible. He should take support while lowering or raising himself and if necessary, while he squats.

Sitting: One must use chairs which support the lumbar region. The dorsal region may or may not be supported. The cervical region does not by itself need any support. He should avoid oversoft or bucket-shaped chairs and stools. Revolving chairs would obviate the need of recurrent neck turning while working. Make sure the height is right in relation to the desk or working surface. If the worktop is too high, sit on a stool of correct height, raise the height of the chair or keep a cushion underneath you. Short seats and high work tables demand raising of scapular girdles and upper limbs for prolonged periods of time and cause pain. Reading stands or sloping desks may be useful. Vision defects should be corrected by wearing glasses (monofocal for short range, bifocal for near and mid-range, or only midrange etc.). This is especially true if you are using video display terminal of a computer.

Avoid keeping the neck in any fixed posture for long. Deliberately move your neck often or get up and break continuity of sitting in one position.

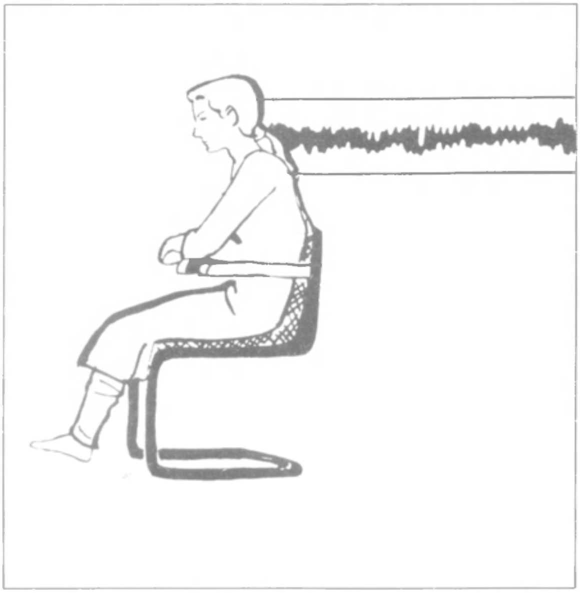


Fig. 38A. Cervical Muscular Function during Common Sitting Activities

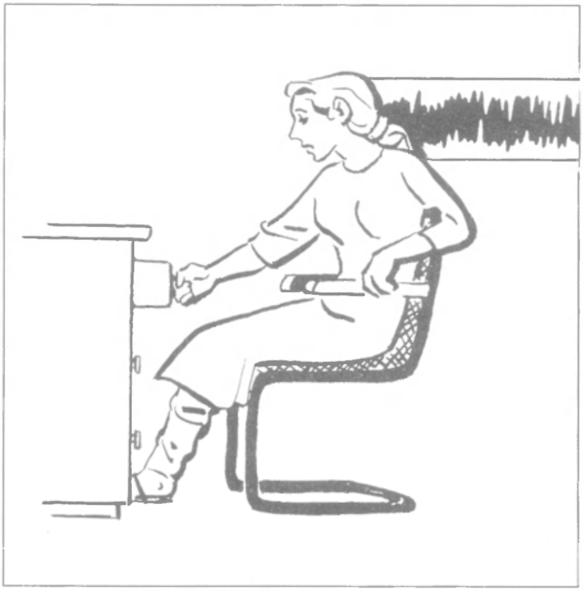


Fig. 38B. Cervical Muscular Function during Common Sitting Activities

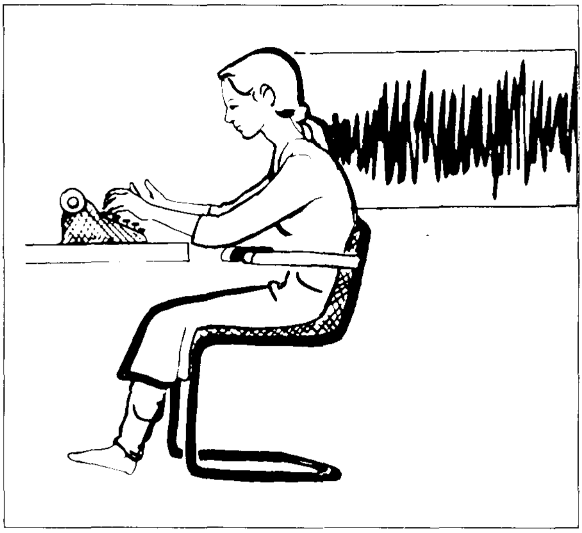


Fig. 38C. Cervical Muscular Function during Common Sitting Activities

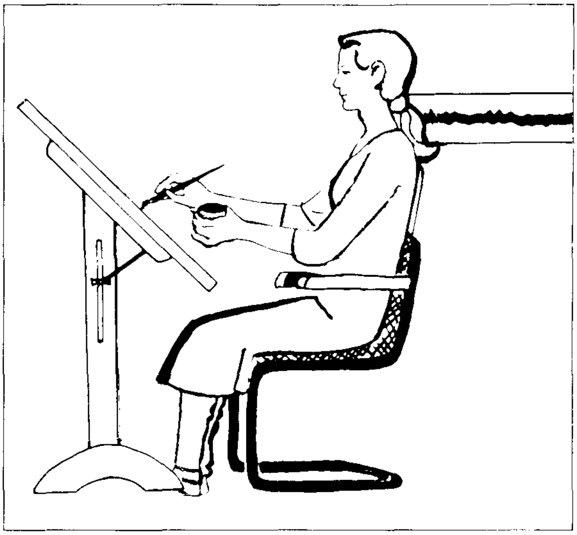


Fig. 38D. Cervical Muscular Function during Common Sitting Activities

Working Heights: Arrange your workspace or kitchen to avoid bending, stretching or shrugging unnecessarily. Keep your back straight at all times and do not bend over items on the floor. Kneel down if you have to work on the floor. Try and keep items that are used regularly in handy places to avoid stretching to reach higher shelves.

Walking: Walk tall. Try to keep your back straight and flat rather than bent backwards, keeping your shoulders reasonably far back, chest forward and tummy in. Avoid sudden movements.

Bed and Pillow: Use any firm bed which does not sag. Avoid using foam mattresses or spring beds like sofa. An ordinary cotton mattress or even rubberized coir can be used. Very hard surface underneath your body like only a mat on the ground is likely to give you pressure pains at various places. Many of our soft tissues are not used to such hard surface and may grumble after sitting on it during long distance travel.

Many patients complain of neck pain and stiffness early in the morning. The neck is supposedly rested at night and there is hardly any muscular functioning. The early morning neck pain, therefore, is not a fatigue-related pain but related to the overnight resting position. There is a widespread misconception both amongst lay people and also medicos, that a patient suffering from neck pain must not use a pillow. Unfortunately many orthopaedic and neurosurgeons also advise their patients to stop using a pillow. Every person needs different size and shape of a firm pillow. Do not sleep without a pillow. Only children with excellent flexibility and painless cervical region can do that. Do not sleep prone; this requires forcibly keeping the neck turned on one side for a long time. An average person usually requires a firm, thin pillow while sleeping supine. This thickness usually corresponds to his mid-forearm thickness. This pillow must be sufficiently caudal to support cervicothoracic region and no part of the spine should remain unsupported.

If you are in the habit of reading in the bed, you cannot read unless you have two or three pillows. This puts the neck in a very undesirable flexion stance. One can read using a thin pillow if he keeps a thick pillow on the chest and the book on it. It is easy to turn prone and read.

This single thin pillow is inadequate to support the neck in neutral stance while sleeping on one side. The neck would be in some degree at a lateral tilt. The pillow now must be changed to a thicker one.

WRONG Figs. 39, 40, 41, 42, 43 & 44 Neck Support while sleeping **RIGHT**

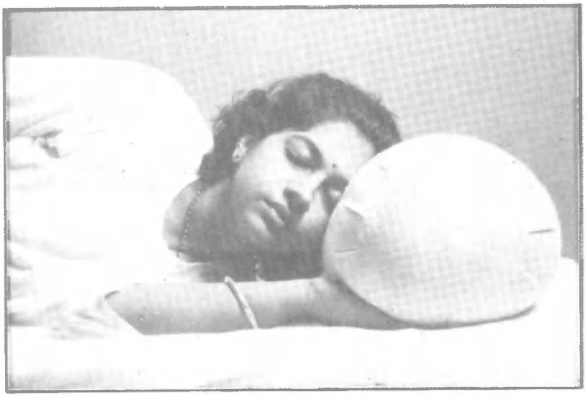


Fig. 39

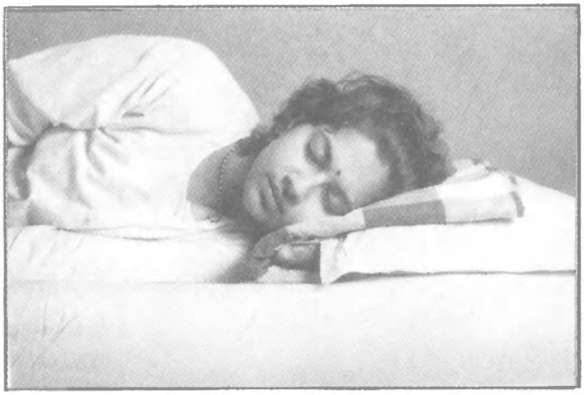


Fig. 40

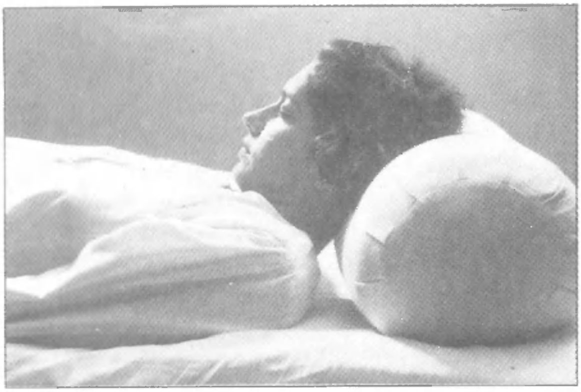


Fig. 41

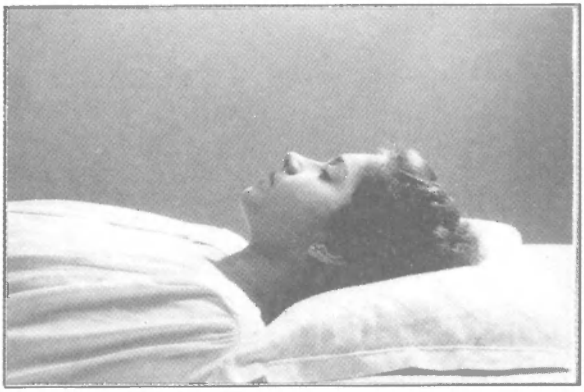


Fig. 42

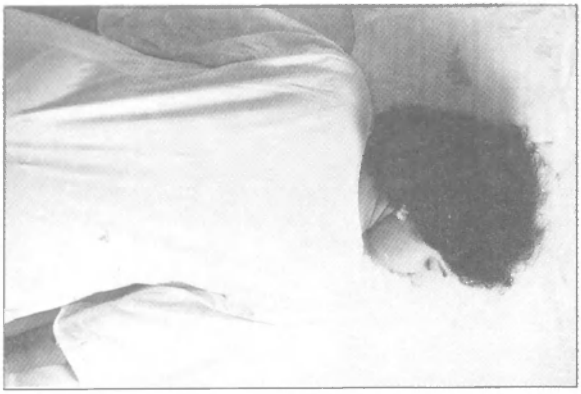


Fig. 43

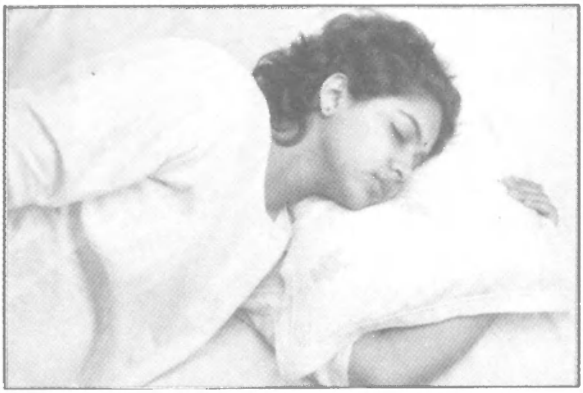


Fig. 44

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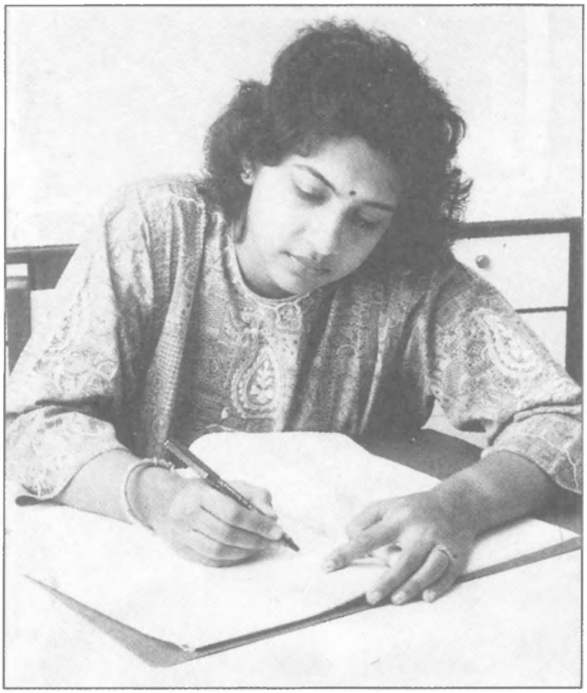

Fig. 45 Common Activities

Alternately another pillow (or bedsheet folded in pillow cover) of appropriate thickness should be added, only to be removed when one turns back supine. This extra thickness is to be determined by the person himself by trial and error only. A keen awareness of maintaining neutrality of the cervical stance at all the times soon develops into a reflex habit and in a few days most patients learn swapping the pillows. The pillow should ideally support the mandible which would stop rotational movements. Again no part of the neck should remain unsupported and hanging. The ready-made commercially available Cervical Pillows may suit only a few people. Majority of the patients adjust pillow usage by trial and error.

RIGHT

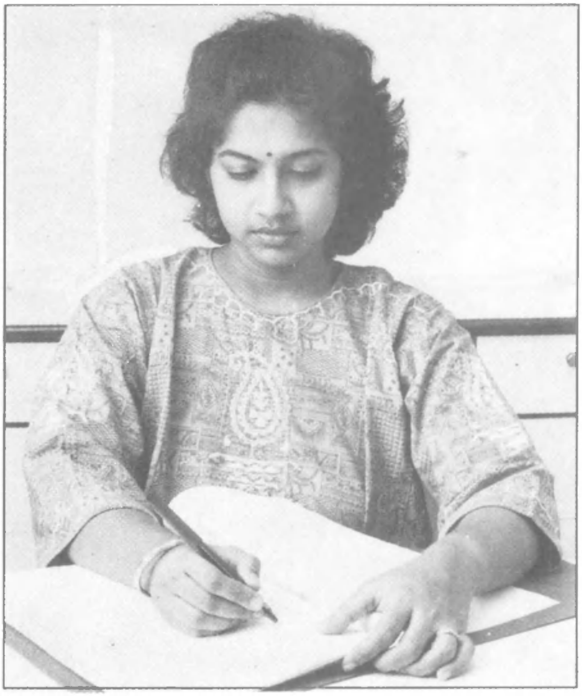

Fig. 46 Common Activities

Driving: Ride a two-wheeler only after discussing with your doctor. Ride short distance, and be cautious to avoid jerks. One has to make sure that the driving seat in the car is really good with all kinds of adjustments possible, to suit your neck and back. The seat must be kept as forward as is comfortable. Please see that the seat is correctly adjusted so that you can sit straight with back supported and legs not too extended. Continuous driving for long hours should be avoided.

Do deep breathing exercises like 'Pranayam' as often as possible every day. Try to avoid or reduce mental and emotional stress by yoga, meditation, relaxation or by pursuing healthy hobbies and recreational activities.

WRONG Figs. 47, 48, 49 & 50 Common Activities **RIGHT**

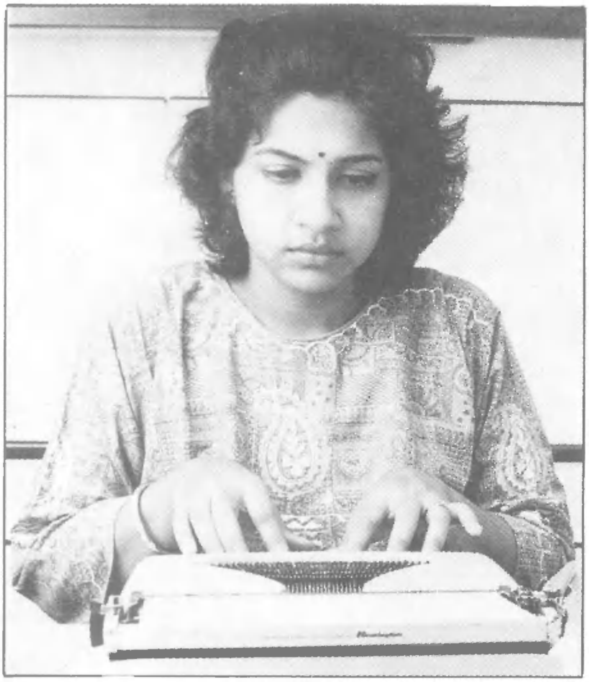

Fig. 47

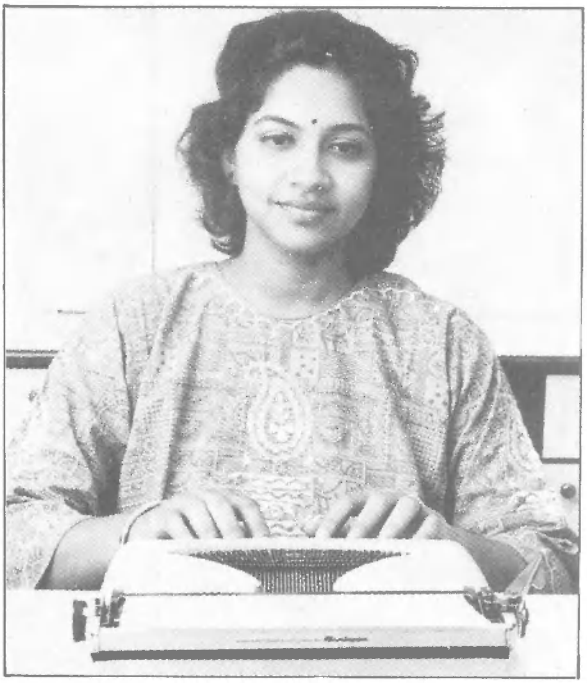

Fig. 48

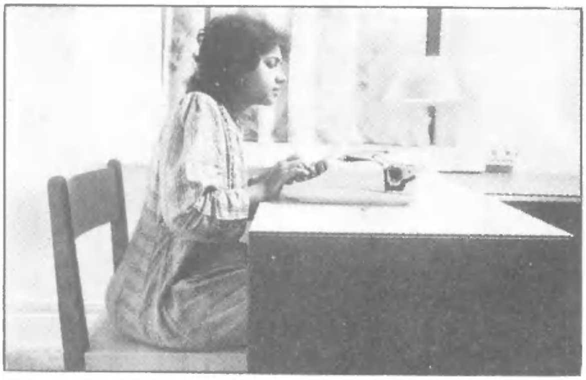

Fig. 49

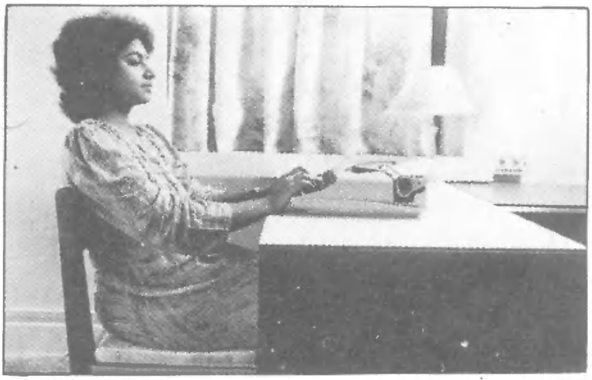

Fig. 50

WRONG

Figs. 51, 52, 53 & 54 Common Activities

RIGHT

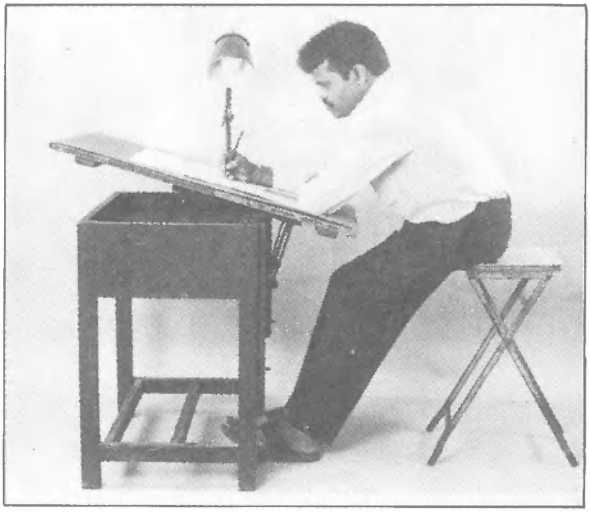
Fig. 51

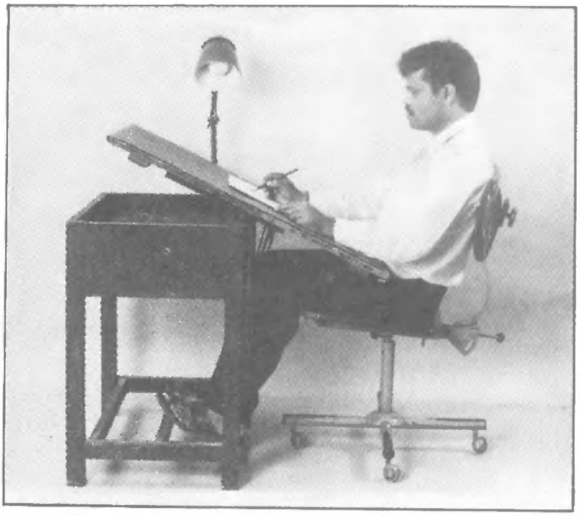
Fig. 52

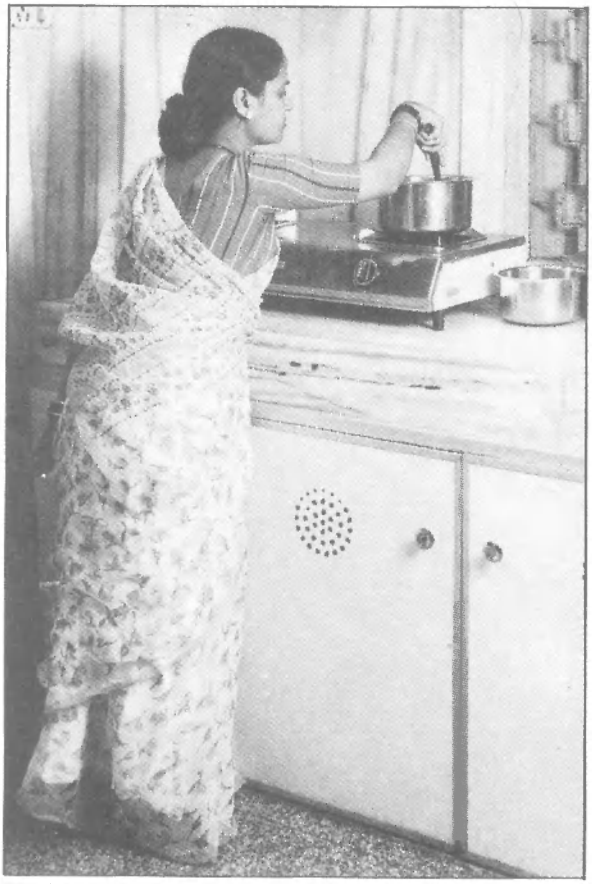
Fig. 53

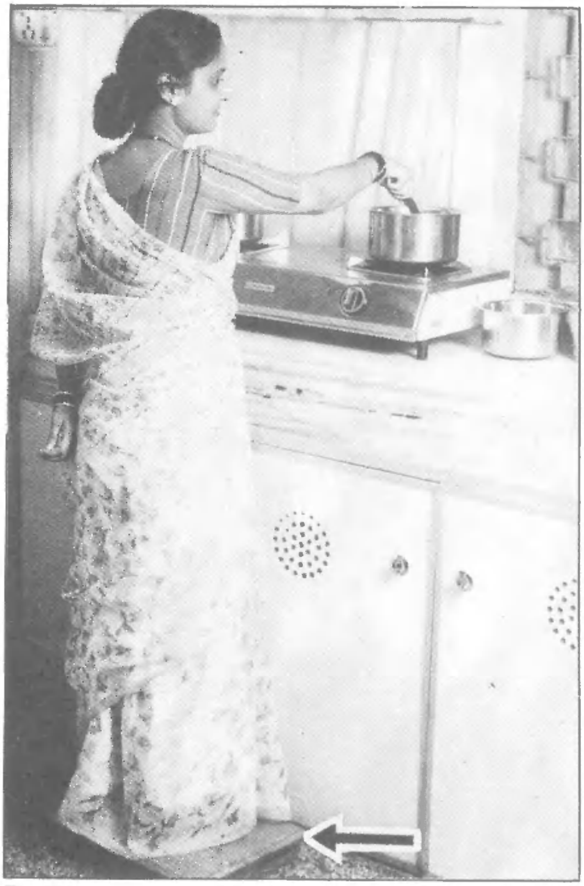
Fig. 54

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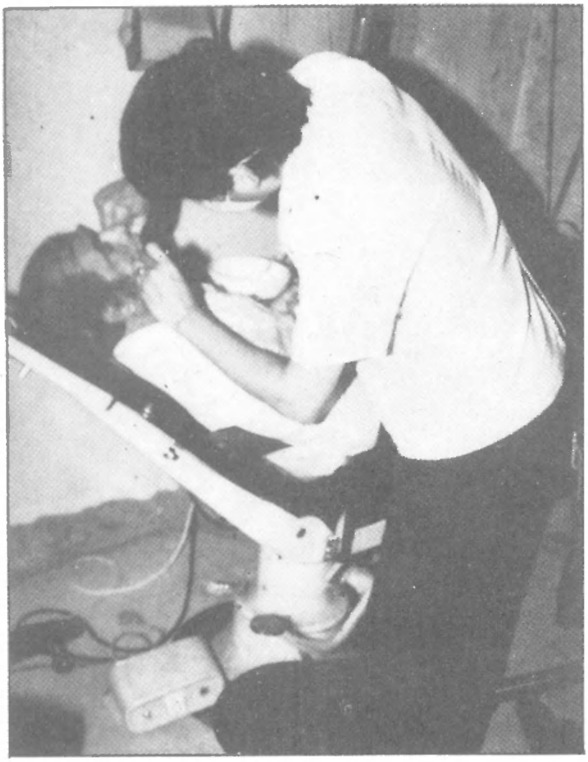

Fig. 55 Common Activities

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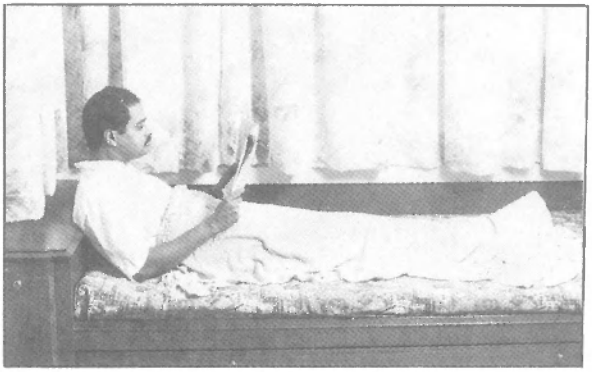

Fig. 56 Common Activities

RECOMMENDED READING

1. Muscles Alive by J. V. Basmajian, Published by Williams & Wilkins.
2. Mobilisation of the Spine by Gregory P. Grieve, Published by Churchill Livingstone.
3. Modern Manual Therapy of the Vertebral Column, Edited by Gregory P. Grieve, Published by Churchill Livingstone.
4. Clinical Biomechanics of the Spine by Augustus A. White III & Manohar Panjabi, Published by Lippincott.
5. The Back — Relief From Pain by Dr. Alan Stoddard, Published by Martin Dunitz.